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## Abstract

Proposal development is a very complex process. While the existing river of instructional materials for proposal development runs wide, the body of empirical research regarding this topic is narrow, especially concerning information behaviors surrounding the process. This study responds to this need as an empirical examination of a user-based method for improving our understanding of proposal development information behaviors.

A hybrid concept of problem/situation is adopted for the purpose of characterizing proposal development as a problem situated in time and space, with institutions of higher education (IHEs) faculty as the users or population of interest for this study. This study asserts that an awareness of the information behaviors among faculty – as tied to their situational positioning and cognitive movements through that situation – can be developed to inform the design, development and facilitation of collaborative activities surrounding proposal development.

Data for this study were collected through in-depth interviews with twenty-seven (27) faculty members from eleven (11) departments at four (4) schools and colleges of a single research-intensive university. Data analysis led to the development of a new dynamic, iterative model of faculty cognitive behaviors during proposal development – the primary contribution of this study. Additionally, this study presents questions faculty members had and constraints they perceived in relation to their situational positioning during development of a proposal. Finally, this study discusses the applicability and potential benefits of user-based investigations to improve proposal development in higher education. The design and results of this study contribute to both information behaviors

research and to discussions and investigations surrounding proposal development within the field of research administration.

**Information Behaviors in Higher Education Research Administration:  
Support for Collaborative Proposal Development Activities**

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DOCTORAL THESIS

Submitted in partial fulfillment of the requirements for the  
degree of Doctorate of Professional Studies in Information Management  
in the Graduate School of Syracuse University  
May 2011

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# **CHAPTER ONE: Introduction and Overview**

## **1.1 Introduction**

### **Statement of Problem**

Proposal development is a very complex process. Part of this complexity stems from the increasingly regulatory nature of our society. Development and submission of proposals for both non-profit and for-profit entities has become more burdensome, with increases in administrative costs (in time, manpower, and preparatory activities) due to increasing calls for and expectations of accountability from the public sector (Orszag, 2009; EDUCAUSE, 2010; National Science Foundation, 2010b). Additionally, there is the potential for immense variations between submission conditions for any given proposer, which compounds the complexity of this activity.

Each proposal submission is influenced by a combination of individual, group, and institutional interests and contexts, which in turn affect information needs and uses during proposal development. This situational variation is expansive, as a single “applicant” typically submits as part of subgroup (or groups) of a large organization, such as an institution of higher education (IHEs), layering the levels of complexity for different types of situations. Identification and management of the variety of potential variables impacting proposal development seems difficult if not insurmountable. This thesis argues that emphasis should be placed on *similarities* among perceptions between these situations, rather than on individual differences, and more specifically on the similarities of experiences between proposers or “users.” Such a perspective cannot be gained by using a traditional, observer-based approach. Instead, this study puts forth a

user-based approach to investigating the information behaviors of faculty members of IHEs, as an important user group in the proposal development process.

The following chapters describe how a new model for proposal development was created through the identification of similarities in the cognitive movements of users (proposers) – as described in their own words – during the development of a recent proposal. This process included identifying questions and constraints experienced by proposers as tied to their situational positioning – i.e., the attributes surrounding the time and space of the proposal development and submission. This study builds on Nilan and Fletcher’s 1987 study of researchers funded by the National Science Foundation (NSF). The study methodology and the findings generated by employing it are offered as compelling evidence for additional strategic investigation and enhancement of the field of research administration, through the consideration and integration of a user-based model of proposal development.

## **Application and Thesis Design**

This study was influenced by the researcher’s area of practice – proposal development support in research administration at an institution of higher education. In institutions of higher education (IHEs), offices of sponsored research and research administrators are primarily responsible for the provision of proposal development services (Chronister & Killoren, 2006). Such services come with institutional costs, however. This study proposes that a higher return on investment for these costs can be obtained by informing and enhancing current compliance-based research administration services and resources through the incorporation of a user-based perspective. This study sought to determine what kind of research approach could be adopted from the academic

domain to investigate information behaviors of faculty surrounding the development of proposals, in order to provide such a perspective. This thesis describes how a user-based epistemological approach was selected and operationalized to study of information behaviors surrounding proposal development, by employing Dervin's Sense-Making Methodology (SMM) (1983; 1999; Dervin & Foreman-Wernet, 2003) as the primary lens for investigation.

For this study, a modified Micro-Moment Time-Line Interview technique, as informed by SMM, was employed to investigate the *situation* of proposal development, by exploring the cognitive (or cognitive/physical) steps taken by users during the development of a proposal. The situation was further delineated by identifying gaps in understanding as perceived by the users during the process. These gaps were operationalized in the study as questions and constraints perceived by faculty during the development of a recent proposal. This design reflects the incorporation of two conceptual elements of the Sense-Making Triangle – situations and gaps – which were applied and explored for this study in relation to proposal development in IHEs.

The guiding research question for this study was as follows:

*How can a user-based investigation be employed to define and describe information behaviors during proposal development?*

The remainder of this document presents how this research question was addressed for this study. Chapter One describes the combined academic and practitioner lenses through which this question was examined. Chapter Two establishes the state of research surrounding this area, and introduces and justifies a potential method of investigation to respond to the research question. Chapter Three explicitly describes the methods used for

this study. Chapter Four answers the research question by presenting the results from this investigation, including the presentation of a model of proposal development. The model – created through the analysis of user-defined steps in the proposal development process – is accentuated with actual questions and constraints perceived by users during their proposal development experiences.

Chapter Five discusses the findings presented in Chapter Four, and present recommendations for additional research. The benefits and limitations of this study are addressed, and potential implications for the further use of both the methods employed for this study, as well as the further application of the model developed from this study are introduced. This discussion focus on how additional studies regarding the information behaviors of users might be employed to improve research administration, including the potential implications of such studies for the design and facilitation of collaborative proposal development activities. The remainder of Chapter One defines key terms used in this study, establish a theoretical framework of information behaviors as the basis for an investigation of proposal development in IHEs, and justify instances of proposal development within institutions of higher education as an appropriate setting for such research.

## **Definition of Key Terms**

**Cognitive Movement** – A metaphor used to describe how humans experience of life over time; the taking of steps – physical or mental, concurrent or sequential – through

problems/situations (Dervin, 1983; Nilan, Zakaria, Guzman, & Zakaria, 2004; Nilan & D'Eredita, 2008)<sup>1</sup>.

**Constraint** – Any condition perceived by users that either facilitates or hinders cognitive movement (i.e., step-taking). Derived in part from Dervin's conceptualization of information use (Nilan & D'Eredita, 2008), and used in conjunction with “question” during the interview process for this study as the operationalization of users' gaps in understanding during their problem/situation.

**Information** – Defined by Taylor (1986) as “the content of the message, the ‘meaning,’ which informs or ... influences a decision” (p. 8), but also as a blending of terms – including data, information and knowledge – in order to appropriately address provision and use of information by a wide variety of professions and disciplines in an interconnected world. Information resources, however, are differentiated from information alone, and identified by Taylor as the services, packages, and/or “support technologies and systems used to generate, store, organize, move, and display these packages.” While Taylor's broad conception of information is employed for the purpose of this thesis, the term “resources” (defined below) is purposefully employed in place of “information resources.”

**Information behaviors** – Cognitive behaviors associated with perceiving a need for information, seeking information to address that need or using information created or encountered in the environment from other people, e.g., conversation (face-to-face or digital), or from information artifacts, e.g., research articles, data, Web postings. Wilson (2000) defines information behaviors as “the totality of human behavior in relation to

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<sup>1</sup> All physical steps have a corresponding cognitive step before action is taken, however the distinction between physical and mental here is meant to underline the all-encompassing nature of the step.

sources and channels of information” which can include active and passive information seeking and use.

**Information needs** – Information needs are uncertainties that arise from perceptions of a problem a user is addressing. Information need equals information seeking plus the intended information use, while information seeking equals behavior attempting to “bridge” the perceived gap. These needs keep the user from understanding something or from moving forward in addressing the problem.

**Information use** – Information use refers to how an answer to a user’s question is employed; the process of the user employing information in order to reach his/her desired end state.

**Institution** – For the field of research administration, institution refers to colleges, universities, independent research institutes, hospitals, other nonprofit organizations, and industry that conduct externally sponsored projects (Kulakowski & Chronister, 2006, p. 887). In the context of this study, **institutions of higher education (IHEs)** refer to the set of post-secondary or tertiary educational organizations, which according to the US Code general definition are “legally authorized within [the United States] to provide a program of education beyond secondary education, [are] public or nonprofit institution[s], [and are] accredited by a nationally recognized accrediting agency or association.” (Title 20 US Code, Sect. 1001, 2010). Within IHEs are a set of service-oriented units centered on the design, support, and provision of information resources. Academic divisions which have a primary or secondary focus on information delivery – such as libraries and offices of research administration – are challenged with providing services geared toward the entire institution, while remaining sensitive to

numerous “disciplinary dichotomies such as hard and soft, pure and applied, behavioral and natural, paradigmatic and pre-paradigmatic, and life and nonlife” (Birdsall, 2009). The presence of such potential differences within a single organization affirms the value of investigations of information need and use for information service and resource providers.

**Problem/situation** – The problem/situation is a time/space context for human cognitive behavior (Nilan & D’Eredita, 2008), as a preliminary product of sense-making, constrained by the past experiences of an individual (D’Eredita & Nilan, 2007).

**Proposal** – a document written to persuade a potential funder to give a grant (Chapman, 2007, p. 8).

**Proposal Development** – The process of constructing a grant proposal for submission to a potential funder, including but not limited to: planning, discussing, networking, organizing, writing, proofing, budgeting, form-completion, and securing institutional authorization.

**Proposer** – The individual listed as the primary investigator on the proposal, most often the primary developer of the proposal.

**Question** – The operational definition of perceived “gap” which in turn is a user-based conceptual metaphor for uncertainty. Used in this study in conjunction with “constraint.”

**Research Administrator** - An individual who works in an institutional office of research administration or development, or in an institutional sub-entity – such as a school, center or department – who leads, manages or supports the research enterprise of the institution or sub-entity (Chronister & Killoren, 2006).



**Resources** – An appropriate general definition of a resource can be found on Princeton’s WordNetWeb, as: “(n) – a source of aid or support that may be drawn upon when needed)” (<http://wordnetweb.princeton.edu/perl/webwn>). For the purposes of this thesis, resources are elements employed by or potentially employable by users, which allow for movement towards a desired goal or end state. The primary difference between “resources” and “information resources”<sup>2</sup> in this study is that the act of simply connecting with another user with the same problem as a “resource” in and of itself (D’Eredita & Nilan, 2007), though not an “information resource,” *per se*. Resources can include information resources, but also things such as awareness gained by the user through interaction with other individuals, which are used to address uncertainty surrounding a problem/situation (such as advice on step-taking during proposal development, based on another user’s experience). This interaction is an example of information as created by a user, rather than transferred from an expert to a user.

**Sense-Making** – Sense-making has been defined as the internal (cognitive) and external behaviors of an individual which allow him or her to construct their movements through time-space (Dervin, 1983). The term also describes the process by which a user (representing faculty of IHEs for the purpose of this study) attempts to bridge the gap s/he perceives as hindering his/her understanding or ability to address a particular situation as s/he “moves” through time and space (Dervin, 1983, 1999, 2003a/1980, 2003b/1992, 2003d/1981). Sense-making is indicative of both information seeking activities and perceived information needs and uses for an individual. In such a case, information uses include those which help a user understand a situation, or those which help them move through the situation. Sense-making is differentiated from information

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<sup>2</sup> Defined by D’Eredita & Nilan as artifacts of past sense-making efforts (2007, p. 28).

seeking because it incorporates the notion of non-movement when the user experiences uncertainty (e.g., ignoring the gap). Note that “Sense-Making” refers to a research approach (described further in Chapter Three), while “sense-making” refers to the range of cognitive behaviors associated with cognitive movement.

**Steps** – The moving (cognitive only, or cognitive and physical) actions of an individual in a given situation/problem; the operationalization of cognitive movement.<sup>3</sup>

**Submission** – The process of submitting a completed grant proposal for funding consideration.

**Uncertainty** – Uncertainty arises from an individual’s (or individuals’) perceptions of a problem/situation that are not already pre-determined (Carter, 1980; Nilan & D’Eredita, 2008). Dervin has characterized “gap” as a metaphor for uncertainty (1983).

**User** - A “user” for the field of research administration can refer to a faculty, staff or administrative member of an institution who seeks or receives information directly from research administrators, or from information resources supported by research administrators. For the purpose of this study, “user” is the term chosen to refer to those individuals collaborating in proposal development who need, seek, provide, and use information.

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<sup>3</sup> Note that steps can be taken or also “just happen” to a user. This variance is explained further in Chapter Three.

## 1.2 Information Behaviors and Proposal Development

One purpose of this study is to demonstrate the importance and potential implications of considering information behaviors in relation to proposal development, as one activity supported by the field of research administration. Support for proposal development activities is commonly provided through multiple channels in institutions of higher education (IHEs) and received by “users” of these services in many forms – from guides and forms on websites, and in paper; through a-synchronous electronic, or in-person training sessions; and from interpersonal communications between research administrators and proposal developers, received through telephone calls, e-mails or in-person meetings. This thesis argues that greater attention needs to be paid to not the content or format of information delivery, but to the *information behaviors* of users – specifically the steps they take during proposal development and their perceived gaps in understanding surrounding those steps – in order to better support proposal development at IHEs. This includes expanding primarily compliance-based research administration services and resources to incorporate and support collaborative activities between all parties concerned with proposal development. The remainder of this section introduces the conceptual framework for studying information behaviors in this context.

In his preeminent text, *Value-Added Processes in Information Systems* (1986), Robert Taylor aptly predicted:

As our society becomes more information based, the systems that store, organize, and provide information and knowledge will become increasingly critical. [Thus, the primary] reason for the existence of an information system is to store and to

provide information and knowledge in usable chunks<sup>4</sup> to those who presently ... live and work in certain environments, and who, as a result, have or will have certain problems which information may help in clarifying or even solving (p. 24).

Taylor includes noise reduction as an additional consideration for information systems, a concept which is familiar to the field of research administration in terms of system design.<sup>5</sup> As a result of modern society's propensity for overproducing and over-consuming information, Taylor noted a need for creating systems and methods to reduce the "noise" that surrounds us – that is, the information that is useless to us at any given time.<sup>6</sup> Doing this effectively, however, requires intricate knowledge of user information needs. The design of this study is predicated on the assumption that the ranges of these needs can be specified and addressed for specific situations – such as proposal development – by identifying patterns in the steps that users take to negotiate the situation. In other words, by looking for similar behaviors in relation to a general sequence of steps taken to develop a proposal (by employing user-iterated steps in the process to capture information needs associated with their times and spaces in the situation) patterns of information needs can be identified, then used to organize and enhance information services and resources.

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<sup>4</sup> Note that this is a technologically outdated phrase. A modern rendition for the purpose of this paper could read: "Thus the primary reason for the existence of an information system is to maintain links (i.e., track changes and new resources) between users' problems and resources shown to be useful in addressing those problems."

<sup>5</sup> For example, see Zimmerman et al. (2003) which describes the development of an e-mail system for faculty to ensure the delivery of only "timely and relevant funding opportunities" in an effort to reduce noise, identified as "unwanted e-mail" (p. 3).

<sup>6</sup> In the same landmark text, Taylor (1986) argues that traditional content and technology-driven models of the mid-to-late nineteenth century are not sufficient without the addition of a complementary user-driven approach, to tap the complexities of the information age.

The identification of such patterns can be facilitated by adapting existing user-based studies (Dervin & Dewdney, 1986; Nilan & Fletcher, 1987; Dervin, Reinhard, Kerr, Song, & Shen, 2006; Prabha, Conway, & Dickey, 2006; Nilan & Mundkur, 2007; Souto, 2010) with a modeling of steps, detailing users' cognitive movements during a situation. By focusing on the specific time/space information needs of faculty during the proposal development process, rather than relying solely on "such static attributes as demographic, psychological, and geographic descriptions of users, all conceptualized as across time-space identifiers" common to user studies (Souto et al., 2008, p. 4), this study contributes a potential method of noise reduction for the design of proposal development support systems, in effect helping to predict what information is valuable at what points during proposal development and submission. This study also provides evidence for the consideration of collaborative activities as both integral and beneficial to the support of proposal development at IHEs.

### **Conceptual Framework – Sense-Making**

As well as a major champion of the user-based paradigm, Brenda Dervin has been a primary proponent of sense-making behaviors and developer of the Sense-Making Methodology (SMM). Refined by Dervin and her colleagues over a period of over thirty years, the Sense-Making Methodology (as opposed to sensemaking<sup>7</sup>, a conceptually related but different approach promoted by Karl Weick and others) is made up of both philosophical and conceptual premises, combined with related methods, to examine how individuals "make sense" of the world around them, including identifying their

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<sup>7</sup> Karl Weick has written of sensemaking in organizations (Weick, 1995; Weick, Sutcliffe, & Obstfeld, 2005), focusing on sensemaking as a group activity, with an emphasis on the responses of social groups and institutions in ambiguous situations (Case, 2007).

contextualized needs for and uses of information and information resources (Dervin, 1983, 2003c/1997; Dervin & Dewdney, 1986; Dervin & Nilan, 1986; Souto et al., 2008; Dervin & Naumer, 2010). While sense-making refers to the behaviors of individuals, Sense-Making refers to the user-based approach designed to study these behaviors.

Originally derived in large part from the situational and constructivist communication works of Richard Carter and his colleagues,<sup>8</sup> Dervin's SMM attempts to address the "chaos of individuality" by employing gap-bridging as a metaphor for the cognitive movements humans make in order to deal with discontinuities (i.e., uncertainties, gaps) experienced in their mind (or sense). As defined earlier, "cognitive movement" – moving through time and space as if taking a series of steps over time (Nilan et al., 2004) – was originally a central metaphor in Dervin's (1983) Sense-Making Methodology, and is inextricably tied to the concept of problem/situation for this study.

When originally characterizing the sense-making of an individual, Dervin noted a few primary considerations:

- Sense-making is done with a goal or desired end state of the individual in mind;
- It involves the situational conditions surrounding the problem, as perceived/interpreted by the individual; and
- It includes the cognitive, "communicative" behaviors of the individual while moving towards his/her goal (Dervin, 1983).

Information need is characterized in the Sense-Making Methodology with a three-part model known as the Sense-Making Triangle, consisting of Situation-Gaps-Uses, through

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<sup>8</sup> Dervin has since characterized the Sense-Making Methodology as interpretivist, modernist and post-modernist (Dervin & Foreman-Wernet, 2003).

which instances of sense-making are carried out for the purpose of bridging cognitive uncertainty (i.e., Gaps) through the construction of new sense (i.e., Uses).<sup>9</sup>

Dervin's Sense-Making Methodology fits well with Taylor's call for the investigation of value-added processes through information needs and uses, because Dervin's work provides philosophical and conceptual frameworks and methods through which to investigate information behaviors. For this project, Sense-Making is used as a guide for both method and methodological standards. A greater description of the theoretical implications of Sense-Making is carried out in Chapter Two, and a discussion of the contributions of the approach to the methods of this study – including the Micro-Moment Time-Line Interview technique – is included in Chapter Three.

### *Assumptions*

In her original exposition of Sense-Making, Dervin (1983) noted several related assumptions, many of which are relevant to the purposes of this proposal, including:

... that reality is neither complete nor constant but rather filled with fundamental and pervasive discontinuities or gaps ... *Sense-Making assumes that the discontinuity or gap condition is generalizable* [emphasis added] both because all things in reality are not connected and because things are constantly changing (p. 2);

... all information is subjective (p. 2)<sup>10</sup>;

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<sup>9</sup> This original characterization of the Sense-Making Triangle, with "Use" as the third angle, can be found in Dervin's early work (1983) and has since been expanded and revised to include "Helps, Uses, Outcomes" (Dervin & Reinhard, 2006; Souto et al., 2008) and also simply as "Helps" (Dervin, 2008). As this study focused primarily on the first two elements of the Sense-Making Triangle (situation and gaps), differentiation between uses, outcomes and helps will not be made.

<sup>10</sup> A preferred way of stating this for the purposes of this paper is that all information is *intersubjective* due to the nature of human beings as communicators and collaborators.

... people who are sense-making have gaps in situations and assess the value of information, regardless of how it is constructed, in terms of the uses to which they can put it (p. 6);

... we are mandated to make sense in time-space, we get stopped in situations, [and] that we have different uses for information (p. 9).

An additional assumption for the purpose of this study is that the proposal process is primarily linear or sequential, and that a timeline can be employed to compare the stories (i.e., descriptions of steps) of respondents. Though certainly each proposal development situation has unique aspects (and the order of steps describing the users' perceived progress through their proposal development process will vary depending on many factors in regards to the individual's situation), the assumption for the purpose of this investigation is that there will be powerful similarities in these situations if examined sequentially (Nilan, 1992; Nilan & Mundkur, 2007).

While different factors may influence individual step-taking, because of the similarities in users' perceptions of cognitive movement and uncertainty, a model of proposal development can be constructed – not by looking for these differences, but instead by expressly looking for the similarities across perceived experiences. The construction of such a model is further enabled by allowing for the repetition of certain steps at different points in the process, and for the iteration of sequences of steps. This allowance for repetitions and iterations of steps provide flexibility in the application of the model, while not compromising its value as a parsimonious representation of a common activity. It is clear that there are differences between individuals – in single steps or short sequences of steps that lie outside of the proposal development process as



modeled. However, methodologically, by focusing on patterns of movement associated with a particular problem/situation (here, proposal development), a sequential pattern of functionally similar steps in the process can be established and employed to facilitate co-orientation for collaborating among users (e.g., faculty and research administrators) as well as for the timely, virtually noise-free provision of resources (Nolan & D'Eredita, 2008). Additional discussion of the potential utility for a model of faculty cognitive behaviors during proposal development occurs in Chapter Five.

#### *Examining Information Behaviors for Research Administration: Why and How*

The field of research administration exists to support organizational research efforts. As part of this purpose, a significant portion of this effort is devoted to proposal development and submission processes – the necessary front end of many sponsored research endeavors (Chronister & Killoren, 2006). In higher education – the setting for most offices of research administration – research administrators face the ongoing challenge of meeting the changing needs of diverse academic disciplines (Birdsall, 2009). Staff members, websites, training seminars and countless e-mails are provided – all at some level of cost to the institution – as resources to encourage, support and organize institutional research efforts.

Support for the development and submission of proposals, as two primary functions within research administration (Chronister & Killoren, 2006), necessitate ongoing design, delivery and facilitation of information service and resources to the primary recipients of these services – the faculty. In addition to institutional investments made in this area of operations in higher education, professional organizations for

research administrators,<sup>11</sup> the trade journals for these organizations, as well as popular media sources in the field of higher education, all provide continual discussion of issues surrounding the support of proposal development.

Additionally, some notable efforts have been made to advance knowledge in this area through empirical research. Senior research administrators (who often hold terminal degrees and have previously served in faculty positions), as well as faculty from a variety of disciplines – such as higher education, information studies, nursing and psychology – have investigated the various elements of motivations towards; considerations and support for; disparities within; and challenges surrounding proposal development.<sup>12</sup> However, despite organizational interest in and support for proposal development, and much talk in the field surrounding the issues (discussed in Chapter Two), there has been little empirical investigation of information behaviors in relation to the provision information services and resources to support proposal development. This project is intended to fill this conceptual void by investigating information behaviors surrounding proposal development, as a key subset of the field of research administration.

### *Identifying the User*

For the purpose of an investigation of information behaviors surrounding proposal development, it is helpful to adopt Taylor's (1986) broader interpretation of the terms "user," "client," and "customer," which are all assumed to imply "an active agent who seeks or receives information from an information system" (p. 11). Returning to the

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<sup>11</sup> Such as the Society for Research Administrators International (SRA), the National Council of University Administrators (NCURA), and the European Association of Research Managers and Administrators (EARMA).

<sup>12</sup> For example, see: Nilan & Fletcher, 1987; Bogler, 1994; Boyer & Cockriel, 1998; Campbell, 1998; Mundt, 2001; Alli, 2002; Porter, 2004, 2005a, 2005b; National Academies et al., 2005; Anders & Monsivais, 2006; Cole, 2007; Easterly, 2008; Mullen, Murthy, & Teague, 2008; Easterly & Pemberton, 2008; Grimshaw & Wilson, 2009; Rath, 2009.

earlier discussion of proposal development as a subsystem of research administration, a “user” in the field of research administration can refer to a faculty, staff or administrative member who seeks or receives information from research administrators – either directly, or from information resources supported by research administrators. For the purposes of this thesis, “user” is the term chosen to refer to those needing, seeking and receiving resources for proposal development. Regardless of the terminology assigned, however, the focal points of this investigation are: a) the utility of a user-based investigation, b) the collective instances of perceived needs and resources associated with the problem of proposal development, and c) the situation surrounding these instances, e.g., the model of steps taken by the users.

### **Proposal Development as Activity for Investigation**

Proposal development has previously been characterized through empirical research and organizational publications as: a set of activities with identifiable steps in a process (Onofrietti, 2008); as a sequence of topics (National Institute of Health, 2009); a set of defined strategies (National Science Foundation, 2008); one of the ten lifecycle areas attributable to the research process (Grimshaw & Wilson, 2009); and an information problem (Nolan & Fletcher, 1987). These existing characterizations and models of proposal development do not, individually or collectively, provide a one-size-fits-all recipe for proposal development or submission. There are so many variables involved in any given proposal submission that it is unrealistic to expect a single characterization or model to address each instance. However, this thesis posits that attention to information behaviors as modeled across time and space can help to define the “problem” of proposal development from a user-perspective.

The purpose of this study was to investigate the steps a user experiences – as mental or physical movements taken to bridge gaps faced when moving through a problem/situation – and to model these steps in an effort to identify patterns across users. Subsequently, this study serves as a potential reference for the effective organization of information services and resources to support proposal development. Rather than simply investigating and emphasizing individual differences, this study of situated information behaviors sought to uncover similarities among users' steps taken and gaps perceived during their proposal development experiences. This type of investigation is one with a background of proven success (Dervin & Dewdney, 1986; Nilan & Fletcher, 1987; Dervin & Foreman-Wernet, 2003; Dervin et al., 2006); the existence of similarities in the steps that different individuals take – including when they occur during a problem/situation – and in the gaps/uses they perceive associated with a specific step, have been established and re-established through these studies. It is the problematic conditions inherent to the problem that are similar. Thus users employ similar steps (and exhibit similar patterns of steps) to address those problematic conditions, rather than reinventing the wheel for every instance of making sense.

Chapters Two and Three establish the further Sense-Making Methodology (Dervin, 1983, 1999; Dervin & Foreman-Wernet, 2003) as an appropriate lens with which to examine proposal development in terms of understanding the cognitive behaviors relevant to supporting the process. Chapter Two also introduces practitioner and empirically-based models related to proposal development. While there are obvious organizational benefits to be gained from providing institutional models of the submission process for members of that institution, this thesis asserts that a user-based

model of common steps during proposal development, as focused on information behaviors, can be developed and adopted in order to provide additional benefits, including:

- Linking users to potential resources;
- Preparing users for likely impending steps (e.g., potential actions or consideration required, based the previous actions or perceived uncertainties of others at similar points in the problem/situation); and
- Enhancing interactions between parties involved in the process, by providing means for facilitating collaborative activities surrounding proposal development.

However, before applying the benefits of such a user-based investigation, one must be conducted – and to do so, the operational framework for such a study must be established. The next section of Chapter One introduces this framework – a discussion which is continued in Chapter Two through the identification of applicable literature on information behaviors and from the field of research administration.

### **1.3 User-Based Study Design**

#### **Research Question**

The goal of this study was to conduct an empirical investigation of the information behaviors surrounding proposal development, in order to make contributions to both the practice of research administration, as well as the field of information studies. The following research question has been applied to achieve this goal:

*How can a user-based investigation be employed to define and describe information behaviors during proposal development?*

In order to more accurately determine how to structure, deliver and facilitate resources to support proposal development in IHEs, this study asserts that research administrators should look beyond simply providing subject matter-based answers to direct questions, and instead conduct holistic investigations of the situation or “problem” of proposal development. Such holistic investigations support the growing call in research administration to understand faculty perspectives in order to affect positive change.<sup>13</sup> The remainder of Chapter One is used to set the stage for a practice-based investigation of information behaviors surrounding proposal development, through an application of elements of the Sense-Making Methodology.

## **Problem/Situation**

For the purposes of this project, proposal development is characterized as a problem/situation of relevance to institutions of higher education and the field of research administration. This characterization of proposal development is explicated in Chapter Two. Underlying this problem/situation is a need for funding, or the immediate or actionable need to write a successful proposal to secure such funding. The examination of problem (bound in time and space as described earlier in Chapter One) as a unit of analysis, as opposed to the individual, has been supported as a way to promote the understanding and management of changes which constantly impact the provision of access to resources (Nilan & D'Eredita, 2008).

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<sup>13</sup> For example, see Monahan and Pascucci (2011); and Walden and Bryan (2010), building on Boyer and Cockriel (1998); as well as Whitecar's (2010) call for “collaboration with partners [which] should be focused on user-centricity instead of techno-centric models.” (p. 17).

Three units of analysis are employed in this investigation of the information behaviors surrounding proposal development: the problem/situation; the steps of that problem and their characteristics (such as time order and type); and the perceived gaps associated with those steps. This multi-unit design reflects a consideration of macro and micro units of analysis to enhance the investigation and acknowledgement of the granularity of problem elements, such as multiple gaps in relation to a single cognitive step (Nilan & D'Eredita, 2008).

### **Steps and Gaps**

Situation is the first element of Dervin's three-part Sense-Making Triangle (Situation-Gap-Use) applied to this study for the purpose of investigating information behaviors surrounding proposal development. For Sense-Making, all behaviors are "situated" (i.e., fixed in time and space) in terms of the user's problem or situation (Nilan, 1992; D'Eredita & Nilan, 2007, Nilan & D'Eredita, 2008). Steps and gaps are two additional components of the Sense-Making Methodology applied in this study ("gaps" are gaps in a user's understanding during a situation and are part of the Sense-Making Triangle referred to above; while "steps" are the efforts of the users to bridge their gaps).

During proposal development, these elements are evidenced as the different steps (cognitive movements or physical steps with related preceding cognitive action) taken or experienced by a proposer during his/her movement through that problem/situation. Movement halts when the proposer perceives a gap in his/her understanding. The gaps can be addressed in three ways – they can be (and often are) ignored; they can be bridged using past sense or through the construction of new sense; or finally, the problem/situation may be refined so that the gaps disappear (Dervin et al., 2003; Dervin

& Naumer, 2010). These possibilities enable a proposer to move forward in the development or submission process – this is the process of sense-making.

Sense-making was investigated in this study by identifying the cognitive steps taken by individual faculty during the “problem” of proposal development, as determined through an application Dervin’s Sense-Making Methodology (Dervin, 1983, 1999, Dervin & Foreman-Wernet, 2003) – specifically steps and gaps – and examined across users to determine potential patterns in information behaviors. An important assumption for the purpose of this study is that as different individuals work through similar problems they will experience similar steps and gaps. As such, this study investigated similarities in steps and gaps during proposal development at an institution of higher education to shed light on the information behaviors of faculty.

Focusing on proposal development as a problem (i.e., the collection of steps and gaps) as a primary unit of analysis speaks to Taylor’s (1986) assertion that users “are not interested in just receiving answers to questions, but rather in addressing problems” (p. 9). As a means of addressing the problem of proposal development, similarities – or patterns – of steps and gaps are reported Chapter Four, presented as a dynamic and iterative model of proposal development. The presentation and discussion of the development of this model of faculty cognitive behaviors during proposal development provides an in-depth look at the situated information needs of proposers – e.g., the cognitive attributes surrounding the time and space of the development and submission of a proposal – and their cognitive movements through that time and space, in order to inform practitioners in research administration charged with supporting proposal development.



## **Significance of a User-Based Study on Proposal Development**

Massive implications of the shift to the digital era have instigated a call for broad-based information services which address the numerous communities found in an academic setting (Birdsall, 2009; Palmer, Teffeau, & Pirmann, 2009). For example, Birdsall (2009) recently wrote that:

... librarians need to acknowledge the diversity of knowledge systems and adopt a strategy that requires collaboration between libraries and multiple communities of knowing in the development and provision of heterogeneous services(¶ 2).

Such considerations certainly hold true outside of the library environment, whereby any information-based service within an academic setting must negotiate the various needs and propensities of the multiple disciplinary communities they serve – a primary consideration for the field of research administration. This study posits the potential values of a user-based examination of information behaviors as a way to recognize the variance within and yet identify the common needs across such communities, in an effort to enhance services and resources provided by this traditionally compliance-driven field. It is hoped this study will instigate a new thread of conversation in research administration surrounding information behaviors, as well as demonstrate this style of investigation as a method for the development of collaborative services and resources in support of proposal development.

### **1.4 Chapter One Summary**

To summarize the main components of this study, proposal development at institutions of higher education (IHEs) was characterized as a problem/situation of focus,

which was examined through a user-based research design as the primary unit of analysis for this study. Each proposal development experience is recognized as unique, but anchored in time and space, which enables and supports the investigation of similarities in information behaviors across experiences. The Sense-Making Methodology was chosen as a set of tools to tap the information behaviors of users during the “problem” of proposal development, and faculty of institutions of higher education (IHEs) were selected as the set of users for which information behaviors were investigated.

Chapter Two will now proceed with a discussion of the relevant literature on information behavior, information behaviors of faculty (of various disciplines), and proposal development in higher education, specifically identifying the role of gray literature<sup>14</sup> and trade publications in positioning proposal development as a topic for investigation. Nilan and Fletcher (1987) and Grimshaw and Wilson (2009) are discussed as examples of empirical work that marry the topics of information behavior and proposal development. This study builds upon the Nilan and Fletcher study, as a means to describe and address the recognized increasing complexities of proposal development in higher education (Chronister & Killoren, 2006; EDUCAUSE, 2010; National Science Foundation, 2010b) and to delineate the applicability and potential value of a user-based study of information behaviors to inform this area of research administration.

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<sup>14</sup> Defined by the Grey Literature Network Service (<http://www.greynet.org>) as “information produced on all levels of government, academics, business and industry in electronic and print formats not controlled by commercial publishing, i.e., where publishing is not the primary activity of the producing body.” Accessed August 25, 2010.

## CHAPTER TWO: Literature Review

### 2.1 Introduction

As described in Chapter One, proposal development is a complex process of both fiscal and organizational significance for institutions of higher education (IHEs). Indeed, a whole field (research administration) is predicated on the conduct and success of this activity. However, provision of information services and resources to support proposal development is constrained by the growing regulatory nature of sponsored research. This thesis proposes that a user-based study of the information behaviors of faculty can be employed to enhance the design, delivery and/or facilitation of such services and resources, by providing the means for collaborative recognition of the needs and limitations of multiple parties in the process.

This is not to say that the needs of faculty during the process have not been previously assessed. Indeed, a portion of this chapter pays heed to the wealth of trade publications concerning the support and analysis of proposal development processes, including articles in peer-reviewed publications such as the *Journal of Sponsored Research* and the *Research Administration Review*. Instead, what is recognized is the potential for additional studies focusing on behaviors of participants in the proposal development process – a topic which this researcher asserts should be of valid concern to research administrators as providers of information services and resources.

This chapter begins with an overview of the current prominence of gray literature and trade publications on proposal development, positioning this topic as one of interest and significance in the fields of higher education and research administration. This section includes a brief presentation of examples of different practice-based models of

proposal development, followed by a discussion of existing empirical research relevant to proposal development, including description of Nilan and Fletcher's (1987) study of the information behaviors of NSF-funded researchers surrounding the development of their funded proposals. It is this investigation from which inspiration for the current study was drawn. Next, the user-based paradigm is introduced, prominent models of information behaviors relevant to the purposes of this proposal are identified, and the application of a user-based study design to one area of research administration is addressed.

The Sense-Making Methodology (SMM) of Brenda Dervin (1983, 1999; Dervin & Foreman-Wernet, 2003) is highlighted as the primary lens for this investigation of information behaviors surrounding proposal development, and conceptual elements of SMM are introduced, beginning with discussion of information needs and uses, and focusing on the work of the late Robert S. Taylor and of Brenda Dervin. A linkage is established between the study of information behaviors and uses and the topic of proposal development in institutions of higher education (IHEs). This discussion includes a positing of the user-based Sense-Making Methodology as an appropriate means for investigating the "problem" of proposal development. Finally, the application of a study of information behaviors to the realm of proposal development is established.

## **2.2 Gray Literature, Trade Publications and Empirical Research**

Research, and more specifically, research conducted at institutions of higher education, is a multi-billion dollar industry in the United States. In 2008 alone, \$113.2 billion in federal funds were obligated for research and development and R&D plant (facilities and fixed equipment) spending (Pollak, 2009), while overall spending on

academic research totaled \$51.2 billion in 2008 (Borouch, 2010). However, while the overall rate of sponsored research has been rising steadily in recent years (see Figure 1 in Britt, 2009; Figure 2 in Borouch, 2010; and Brainard, 2008), the economics of research funding has moved from a period of prosperity to one of challenge. Discussion of challenges faced by federal and private funders, as well as the trickle-down to academic institutions, has abounded in trade and scholarly publications; in both academic and public arenas (for instance, see Barton & Wilhelm, 2009; Berdahl, 2009; Brainard, 2008; Foundation Center, 2010; Johnston, 2009; LBG Research Institute, 2009; National Science Foundation, 2009; Pollak, 2009; and Wilhelm, 2009). Due to increased competition for shrinking federal and private dollars, and increased pressure to compete for these dollars (Porter, 2003 and 2004), universities have had to raise both the volume and quality of proposals submitted, in order to retain, much less increase, monies received. Increased competition for funding, however, implies much more for research universities than simply stepping up proposal activity.

Previous research has shown that various forms of funding and resource allocation affect both university administration and faculty behavior at the individual level (Fetterman, 1998; Liefner, 2003). Recent survey research has been conducted on faculty resource needs and usage (Liefner, 2003; Mullen et al., 2008). Mullen et al. (2008), for instance, found that, “across all faculty ranks financial and material resources are deemed critical for supporting faculty members' research efforts.” Other studies have shown that discussions of specific faculty experiences within higher education can prompt open dialogue, instill greater consciousness, empathy, and empowerment among faculty, and help to guide positive institutional responses (Norman, Ambrose & Huston,

2006). Additionally, empirical research has specifically been conducted to model academic proposal development (Nilan & Fletcher, 1987), and to identify user needs in the research cycle (Grimshaw & Wilson, 2009). But, with the exception of the Nilan & Fletcher and Grimshaw & Wilson user studies, no evidence was found of research focusing on the information behaviors of faculty during the proposal development process. The purpose of the literature review detailed in the next few sections is to provide evidence of the rising importance of the topic of proposal development to many fields, and to position the topic as one which could benefit from a user-based exploration of information behaviors.

### **Proposal Development Literature Search**

When conducting a search for literature related to proposal development for this project, it was determined that the results defaulted into two primary sections for analysis – historical research, and modern research, with modern defined as studies from the year 2000 forward. This period is chosen as more relevant to current proposal development needs due to two conditions: first, the shift from a primarily paper-based to a virtually exclusively electronic submission environment; and second, the rising occurrence of interdisciplinary and more specifically multi-institutional collaborations (Corley, Boardman, & Bozeman, 2006), which often necessarily involve electronic communication and/or web-based processes for development, as well as increasingly complicated and costly coordination (Cummings & Kiesler, 2007).

When using the database-generated descriptor "proposal writing" in the Education Resources Information Center (ERIC) database, results included 512 articles, reports and books from pre-1966 through 2010: 179 included an additional descriptor of "higher ed,"

226 were journal articles, 21 were books, and the remainders were guides, reports, reference materials, legal or legislative materials, etc.<sup>15</sup> To give some chronological perspective on the search results: one article was from pre 1966-1970; 65 were from 1971-1980; 179 were from 1981-1990; 192 from 1991-2000; and 71 from 2001-2010. The severe dip in literature in the past ten years may be a reflection of the number of items not yet recorded in the ERIC database.

Of the hundreds of results for this search, many had snazzy titles, and many contained anecdotal advice, but few represented examples of empirically-based research to validate their advice. The contents of the results were often easily identified, as terms such as “guide,” “how-to,” “manual” were used in the product description, if not in the actual title. A few historical and recent examples of the types of resources discovered in this search included:

“A Winning Strategy: For Victory in the Home Stretch, Spend More Time Cultivating Foundations and Less Mailing Proposals” (Glass, 1980).

“Tapping Hidden Resources: Building Blocks for Training Staff and Students in Proposal Development” (Bender & Watts-Penny, 1987).

“The Better Ways to Win a Grant: Tips from “T&L” Grant Guru.” (Carnow, 2008)

“No Money? Write a Winning Grant Proposal.” (Stephens, P., 2009)

The research selected for this review, however, does not cover all topics which are relevant to research development. Such topics include many advice-based (or how-to)

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<sup>15</sup> The search of the ERIC database was conducted on June 17, 2010.

articles and books, and modern textbooks such as *Write an Effective Funding Application: A Guide for Researchers and Scholars* (Walters, 2009). To portray the breadth of the body of proposal development related literature, one can include:

- Practitioner-based articles (for example, Molfese & Karp, 2006; Porter articles of 2003, 2004, 2005a, 2005b, 2007, 2009; Yates, 2006);
- Faculty research performance, proclivity and productivity related to sponsored research (for example see Bentley & Blackburn, 1990; Alli, 2002; Porter, 2007);
- Faculty motivation and satisfaction (for example see Blackburn & Lawrence, 1995; Chen, Gupta, & Hoshower, 2006; Norman, Ambrose, & Huston, 2006);
- Faculty perspectives as related to research administration (Wimsatt, Trice, & Langlet, 2009);
- Institutional promotion and incentivizing of research (for example, Onyefulu & Ogunrinade, 2005; Chronister, 2006, Rath, 2009; Stipling, 2010);
- General studies on faculty (for example see the National Study of Postsecondary Faculty, NSOPF: 2004); and research and teaching (for example see Daly, 1994; Tang & Chamberlain, 1997; Ebong, 1999; Teagle Working Group on the Teacher-Scholar, 2007).

In addition to the trade publications, gray literature and research articles mentioned above, a few particularly relevant studies and publications are discussed in detail in the next sections.



## *Dissertations*

Related dissertations include Chapman's *Best Practices in Grant Writing at Small Colleges*, for which the author conducted a survey of grant writers at independent small colleges in multiple mid-eastern states in the U.S. to "discover their typical processes, personnel management, and whether these colleges encouraged effective grantsmanship" (2007, p. 4). The subjects of study were staff members of the independent colleges, most either tasked with grant-writing as a primary task, or serving in some administrative capacity with grantwriting as one of many duties. Examples of literature involving faculty as the primary subjects of study include: Fortin's higher education dissertation on faculty use of the World Wide Web (2000); Cole's model of researcher behavior (2006, 2007); and the discipline-based study of Campbell (2000), who attempts to determine factors for federal-funding success in the disciplines of biology and mathematics.

The applicability of the Fortin (2000) study to this literature review lies in the efforts to model the information seeking behavior of faculty. As a particularly relevant example from higher education, Fortin cemented the methods of his study of faculty in grounded theory – which guides his process and analysis of interviews – then focused his interpretation of results through existing models of information seeking behavior common to the realms of library science. Fortin's efforts centered on investigating the information behaviors of faculty – for the purpose of informing university administrators, information providers and systems designers – similar to the intents of this research project. Fortin's work focused specifically on information behaviors in the digital environment, and results included a proposed model of faculty use of the World Wide Web. This thesis also proposes a model of information behavior as drawn from

interviews with faculty (as detailed in Chapter Four), but one focused on behaviors (cognitive, electronic, in-person, etc.) surrounding the activity of proposal development, rather than on a single realm of information interaction.

Cole's (2006, 2007) model of researcher behavior is actually an extension of Campbell's (2000) federal funding success model for faculty in the disciplines of biology and mathematics. Campbell (2000) investigated the submission and award requirements of the six largest federal funding agencies in an attempt to determine what variables determine success in the receipt of federal grants (as measured by the value and number of grants received). Campbell's resultant Composite Model of Federal Funding Success (2000, p. 3) was comprised of system-based variables including grant types and type of federal agency; individual variables including type of research, means of networking and record of accomplishment; support-based variables including types of university support and research team support; and level of individual effort, including number of agencies applied to, grants applied for, and number of awards received.

Cole (2006, 2007) also attempted to identify significant behaviors related to the obtainment of grant funding by faculty by extending Campbell's investigation of biology and mathematics faculty. Cole tested Campbell's original model, but applied it across more disciplines, including the physical sciences and computer sciences. Using full-time faculty from universities across California and Texas, Cole attempted not only to reaffirm Campbell's findings of behaviors influential for faculty funding success, but also to identify factors that encourage faculty to pursue federal funding. Descriptive statistics were used to generate the primary features of the data gained from the 286 surveys received (Cole, 2006, p. 61). Cole's findings included: the reaffirmation of Campbell's

model of federal funding success; the creation of a demographic profile of faculty successful in gaining federal funding; the identification of factors that encourage pursuit of federal funding in higher education; and the generation of two new models of funding success for faculty in multiple disciplines: the Dollar Value Model for Federal Funding Success, and the Number of Awards Model for Federal Funding Success, as well as a consolidated model for federal funding success (Cole, 2007).

Campbell and Cole's studies of faculty behaviors in the grant process are of definite relevance to the purpose of this literature review, and the Composite Federal Funding Success Model, as well as Cole's extensions of this model in particular, bears many characteristics that could also be employed variables in an investigation of the proposal development process. Similar to the way in which Cole builds on Campbell's work, this study builds upon an existing investigation of information behaviors surrounding proposal development (Nilan & Fletcher, 1987), and compare resultant models. Rather than conducting a survey study focusing on indicators of successful receipt of federal grant awards, however, this study employed in-depth interviews to explore and describe the proposal development process for multiple types of funders. In addition to dissertations such as these, there is a wealth of literature on proposal development in trade publications and the instructive and prescriptive proposal development (also referred to as grantwriting) literature, selections of which are introduced and reviewed in the following section.

### **Trade Publications**

As an extension of her dissertation on the replication of a model of federal funding success, Cole produced an article for practitioners in the journal for the National

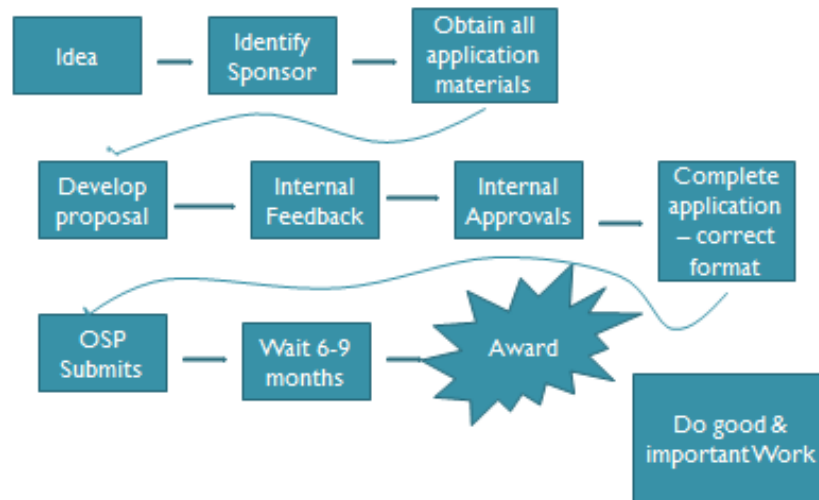
Council of University Research Administrators (NCURA), the *Research Management Review*, or RMR (Cole, 2007). Other examples of literature in research administration that speak specifically to proposal development include numerous articles and presentations available on or linked to through the websites of the main professional organizations, available to organizational members.<sup>16</sup> Many organizations host publically available websites with instructional and discussion materials (e.g., the Foundation Center at [www.foundationcenter.org](http://www.foundationcenter.org) and the Grantsmanship Center at [www.tgci.com](http://www.tgci.com)). Proposal development resources are also openly accessible on the institutional websites of IHEs (for example, see the Grantseeker's Toolkit, provided by the Office of Research at the University of Tennessee, <http://research.utk.edu/pd/toolkit.shtml>), and there are a host of print reference-based materials available that cater towards research administrators, such as the massive volume, *Research Administration and Management*, edited by Elliott Kulakowski and Lynne Chronister (2006) . Many such resources include models of and instructions for proposal development.

An example of a general proposal development model, as presented for faculty orientation to an institutional-based process, is shown in Figure 2.3 below.

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<sup>16</sup> These include the European Association of Research Managers and Administrators (EARMA) at <http://www.earma.org>; the National Council of University Research Administrators (NCURA) at <http://www.ncura.org>; the National Organization of Research Development Professionals (NORDP), at <http://nordp.org>; the Society of Research Administrators International (SRA) at <http://www.srainternational.org>.

# Proposal development lifecycle



**Figure 2.1: Example of Institutionally-Based Proposal Development Model** (Lowney, 2010, p.4)

Instructional examples often include various combinations of general or specific steps in the proposal development process, such as (but not limited to): project idea development; proposal team creation; proposal component creation; editing; and submission considerations. For example, in a presentation on proposal preparation, processing, and review, developed by Tony Onofrietti at the University of Utah, sub-steps are broken out for each of the main steps of the proposal development process as displayed in the author's modeled "pathway to success" (Onofrietti, 2008). These sub-steps are summarized below in Table 2.1.

**Table 2.1: Steps to Successful Proposal Development** (adapted from Onofrietti, 2008)

Step 1: Concept Outline	Step 2: Finding the \$\$\$	Step 3: Develop a Proposal Plan	Step 4: Writing Your Proposal	Step 5: Proposal Review and Editing	Step 6: Submit Proposal
Clarify your thoughts	Search Electronic Databases	Critical Resources	Identify Proposal Components	Provide Program Priorities & Review Criteria	Submit through Office of Sponsored Programs
Identify keywords for a funding source	Search Agency & Organization Websites	Team Approach	Write Competitively	Give Reviewers Adequate Time to Read	Use OSP as a Research Partner
Prepare to Discuss Project with Potential Partners or Agency Program Officer	Search Agency & Organization Websites	Establish a Schedule	Follow the Guidelines	Draft # 1 – Review by Proposal Team	Consider Ethical Standards
	Talk to Previous Grant Recipients		Write to Communicate	Draft #2, 3, etc, - Review by Others	Be Aware of Internal Institutional) Deadlines
	Obtain Copies of Successful Proposals		Write Concisely	Final Draft	Complete Internal Paperwork
					Construct Budget

The components of this model were drawn from the author’s years of professional practice in research administration, and even include terminology similar to those employed in this study – such as the use of “steps” as an indication of how a faculty member moves through the development of a proposal.

## **Instructional and Prescriptive Materials**

As noted by Chapman in his study of grantwriting at small colleges in the United States, grantwriting in American higher education is a practice as old as the first such institutions in the nation and serves a major role in collegiate fund raising today (2007, p. 1). Kenneth T. Henson’s popular book, *Grant Writing in Higher Education: A Step-by-Step Guide* (2004) is one of many instruction-oriented texts available to the grantwriting community, but one of a few focused specifically on higher education. Besides serving as an instructional guide, Henson’s text addresses attitudes about grant writing that can bolster or hinder an academic grant writer, advocating an internal, proactive locus of

control to successfully ward off negative myths about grant writing. Per Henson, such myths include the “fact” that only large, prestigious institutions receive grant funding (2004).

Another related text, which maintains an indirect focus on proposal development, is the National Academies’ *Facilitating Interdisciplinary Research* (2005), which investigates interdisciplinary research (IDR) efforts, and makes recommendations on various ways for U.S. institutions to stimulate and support these types of collaborations. Though published some five odd years ago, the book recognizes the growing importance and frequency of interdisciplinary research, which stems from:

[The] result of four powerful “drivers;” the inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems, and the power of new technologies. (National Academies et al., 2005, p. 2).

A recent essay by Richard Katz (2010) echoes the sentiment of the National Academies study, helping to frame the importance of considerations of information needs and usage in the current intricate and collaborative era of research development. Speaking of the ease with which scholarly communication has come to be circulated (in comparison to the days of postal mail), Katz notes that modern developments are “enlarging the scholar’s personal network[s] and the tapestry of relations woven by scholars and their institutions” (2010, p. 49). In the same piece Katz also asks, “How, then, will the role of the scholarly enterprise as the convener, curator, and steward of knowledge change in the torrential phase of the Digital Age?” and argues that a historic goal of higher education to amass storehouses of information has become archaic in this

era. As such, Katz convincingly puts forth the argument that a new purpose has emerged in higher education – that of a mediator of access to knowledge. In this sense, to mediate can be understood through a definition of the verb as provided by Princeton’s WordNetWeb<sup>17</sup> as “(n) to occupy an intermediate or middle position or form a connecting link or stage between two others.” Such a vision for information mediation could be shared by the field of research administration. If evidence was provided about the specific information needs and usage of faculty members during the proposal development process, research administrators could then use such information to better link the faculty to the right information, *at the right time in the process*.

The prevalence of both gray literature on proposal development in higher education and trade and training publications, supports the author’s assertions of importance of this topic within her area of practice (research administration) as well as within the field of higher education. However, the majority of trade and training publications serve as primarily practice-based, “how-to” recipes for success or calls for additional attention – rather than scientifically-backed investigations or recommendations. In comparison, this research study, and the research study that serves as the basis for this thesis (Nolan & Fletcher, 1987) take a “how did you,” inductive approach to investigating proposal development.

## **Empirical Literature**

The prior section detailed examples of trade-based literature as drawn primarily from publications in the field of research administration. The next section of Chapter

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<sup>17</sup> <http://wordnetweb.princeton.edu/perl/webwn?s=mediate>.



Two identifies relevant examples of historical and modern empirical literature on information behaviors in the realm of higher education.

### *Historical Studies – Faculty Information Behaviors*

One well-known series of studies on the information behaviors of faculty was conducted by David Ellis from the University of Sheffield. Ellis's employed a grounded theory approach to develop a model of the information-seeking patterns of social scientists "as the basis for deriving a more accurate model of such behaviors [that] could, in turn, be used as the basis for making recommendations for information retrieval systems design" (Ellis, 1993, p. 473). Ellis's initial study included semi-structured interviews with primarily social scientists and psychologists – a study which was then expanded to other scientists and humanities researchers. Information behaviors were studied by focusing on the work (regarding research, teaching and other interests) of the researchers. Data from transcripts of interviews were analyzed through qualitative methods, where the coding of transcripts was "carried out in an open way" of first assigning primarily item-on-tem (notes from reviews of materials recorded external to data) then term-on-item (developed codes and concepts transferred transcripts (Ellis, 1993, p. 477). The results of Ellis's studies led to the development of a model of information seeking.

Other applicable historical studies in faculty information behavior include: Boyer & Cockriel (1998), who investigated factors influencing grant writing perceptions of tenured and non-tenured faculty; Ebong (1999) who used a survey and follow-up interviews to identify issues that influence faculty involvement in sponsored projects at one predominantly undergraduate institution (PUI); and Ross (1990), who wrote of the

relationship between research administrators and research scientists as “a key variable in determining the success of an organization’s research endeavor” (p. 5). In her article, Ross explored different behavioral and environmental factors that may influence relationships between research administrators and researchers. The exploration was undertaken in order to address and dispel myths attached to relations between the two groups.

### *Historical Studies – Proposal Development*

Perhaps the first historical accounting of research conducted on proposal development was shared by Desmond Cook in 1984. In his work entitled “Proposal Development and Evaluation: A Synthesis of Empirical Studies,” Cook attempted to establish a perspective on any empirical structures underlying the process. He presented findings related to seven areas of the process, including preparing the proposal, utilization of support services, and perceptions and attitudes. Information behavior, however, was not a dedicated area of interest of the literature reviewed.

In the realm of other historical research, a highly relevant study was conducted involving the identification of the information seeking and information use behaviors of users (in this case primary investigators and related proposal development members) in the specific context of proposal development (Nilan & Fletcher, 1987). In the mid-1980s, Michael Nilan and Patricia Fletcher of Syracuse University conducted a study supported by the National Science Foundation on the process of proposal development among NSF-funded researchers. The authors were attempting to illustrate that focusing on the user could generate a useful structure for discovering information needs and uses, which could then be employed for subsequent design. Though the focus on proposal development was

secondary to the purpose of illustrating a novel approach to design, the resultant multi-step model of the common process provided a detailed picture of its complexities. In fact, the “proposal writing process” was specifically chosen by Nilan and Fletcher because it was seen as incredibly complex and any subsequent pattern identification across selected sampling dimensions (including disciplinary differences, e.g., humanities, engineering and social science) would be of undeniable significance (1987).<sup>18</sup> Table 2.2 below is a presentation of Nilan and Fletcher’s model of the proposal development process (originally labeled “Synthesis of User-Defined Steps in the Research Proposal Preparation Process”).

Though conducted prior to the current era of electronic proposal development and submission methods, the study provides an excellent example of empirical research conducted with higher education faculty (and other federally funded entities) regarding their information behaviors during the proposal development process. By interviewing primary investigators (PIs) and their applicable proposal development colleagues about their last successful proposal submission to the National Science Foundation, the researchers were able to identify enough significant overlap in the aggregated steps perceived by users’ reports of their proposal development experiences to construct a user-based 13-step model of the proposal development process.

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<sup>18</sup> At various points in the article, the subject of the Nilan/Fletcher model is stated as the proposal submission process, proposal writing process, proposal activities, and the proposal preparation process. Though many of these terms are not necessarily interchangeable in the practitioner realm of research administration (proposal writing, for example, is often seen as a subset of proposal development), the intent of the model and of the study itself warrants reference to this study as in fact building from the Nilan and Fletcher study.

**Table 2.2: User-Defined Model of Proposal Activities** (Nilan & Fletcher, 1987, p. 189)

	MAJOR CLASSES OF ACTIVITIES	USER DESCRIPTIONS OF STEPS
1	STARTING/REVIEWING POSSIBILITIES	Reviewing research information
		Checking notices
		Waiting for RFP
		Checking funding sources
		Workshops
2	GETTING AN RFP	We got a request for a proposal
3	FORMULATING TOPIC/AREA	Discover a need
		Thought of what to write/identify topic
		Discussing proposal
4	ORGANIZING/PLANNING/SPECIFYING OBJECTIVES/ASSIGNMENTS	Looking at details
		Preliminary meetings
		Preliminary scheduling
		Identify research plan/model
		Design structure to meet needs
		Brainstorming
		Checking with others in organization
		Preplanning
		Design instruments
5	REVIEWING LITERATURE AND POSITION PAPERS	Identifying background info
		Lit Review
		Preliminary studies
6	REVIEWING THE PLAN	Review with feedback
		Storyboard reviews
		Meeting with people on the project
7	BEGIN WRITING/FIRST DRAFT	Write
8	BUDGETING	Preliminary budget
9	REVIEWING AND EDITING	Staff feedback
		Review
		Edit
		Develop more specific objectives of the proposal
10	REWRITING/FINAL DRAFT	Fine tuning
		Rewrite
		Revise
11	BUDGETING	Final costing exercise
		Make budget
		Check budget
12	FIXING LAST MINUTE DETAILS	Making copies
		Scrambling to meet deadline
		Getting final approval from organization/ superiors
		Finish supporting documents
13	SUBMITTING	Mailing proposal
		Sending the proposal out
		Publish/distribute proposal

The unique contribution of the Nilan and Fletcher model was the characterization of proposal development as a problem and the proposal development process as an instance which could be investigated and interpreted through use of the Sense-Making

Methodology. The Nilan and Fletcher study was used as both the impetus for applying a user-based lens for investigating information behaviors surrounding proposal development and as a model for the application of methods drawn from the Sense-Making Methodology to the exploration of this topic. The current study incorporates similar methods (in-depth, time-line interviews) and presents a similar primary result – a model of proposal development created from the steps in the proposal development process of users. These methods are discussed further in Chapter Three, while the model of faculty cognitive behaviors during proposal development is presented in Chapter Four. Differences between Nilan and Fletcher (1987) and the current study are found in the employment of a different site selection (one institution of higher education, as opposed to multiple research facilities); a different target sample (primary investigators with tenured or tenure-track faculty status, applying for both federal and non-federal funding, rather than federally-funded researchers); and the development of a different interview protocol, including items regarding respondent reflections about their generalized proposal development experiences and their perceptions of institutional support for sponsored research.

### *Modern Studies – Faculty Information Behaviors*

Many modern studies have been conducted to assess the changing needs of faculty and academic institutions in regards to supporting new scholarship and securing external funding (Obendhain & Johnson, 2004; American Council of Learned Societies, 2006; Housewright & Schonfeld, 2008; Palmer et al., 2009; Wimsatt, Trice & Langley, 2009). For example, Debra Easterly explored barriers and supports perceived by female faculty during the proposal development process (2008; Easterly & Pemberton, 2008),

and Housewright and Schonfeld, authors of one of the well-known Ithaca Studies of the digital transformation in higher education, provided indicators of discipline-based differences in information needs and uses among faculty. Other institutional considerations include Litwin's assessment of research strategy as related to grant success in higher education (2009), which demonstrated a model supporting a high correlation between federal research dollars received and strategic emphasis on proposal development by research-intensive universities.

### *Modern Studies – Proposal Development*

None of the more modern studies listed thus far directly examined the information behaviors of faculty in the proposal development process. There is, however, one example of a topically relevant modern, user-based study – Grimshaw and Wilson's (2009) investigation of information needs and resource usage in higher education – which specifically addressed the proposal development process.

Billed as a user-driven consultation process, the authors sought to identify the most wanted electronic tools, systems and processes for research support as noted in focus groups comprised of institutional members involved in research activities. This study was conducted at the University of Nottingham during a period of electronic resource development, and was prompted by a previous survey developed by Dransfield & Wilson (2003, cited in Grimshaw & Wilson, 2009, p. 33) to collect user priorities for improvements to existing research support systems. Grimshaw and Wilson sought to extend the previous study by incorporating feedback from all users of institutional research systems.

For the Grimshaw and Wilson study, data were collected from 41 focus groups over a period of two years. Focus group question generation evolved from the identification of 10 Lifecycle Areas (LAs) that occur in most types of research (as adapted from Wilson, 2004, cited in Grimshaw & Wilson, 2009, p. 37). Of these 10 stages, the first 6 (*italicized*) can be used to represent the research *development* stage:

*LA1) scoping the context when the investigator explores the literature*

*LA2) finding funding*

*LA3) finding collaborators/building relationships*

*LA4) creating a proposal*

*LA5) costing and pricing*

*LA6) approval and submission of the proposal*

LA7) project administration (setup and ongoing monitoring)

LA8) undertaking the research

LA9) outcomes (dissemination and publication, new research, commercialization)

LA10) management of the research portfolio

There are several ways in which the Grimshaw and Wilson study differs from this study of information behaviors surrounding proposal development. For example, the Grimshaw and Wilson study included a focus on the entire research process as a whole, rather than specifically the period of proposal development. Grimshaw and Wilson also did not explore questions and constraints experienced by users during the process, but instead sought to “ascertain from users the sorts of electronic tools, systems and processes they felt would most support them in their work” (Grimshaw & Wilson, 2009, p. 32). Additionally, the Grimshaw and Wilson study did not investigate the information

behaviors of faculty alone, but instead used focus groups with academics, researchers, postgraduate students and research administrators and technicians – basically, all users of research development and administration tools, systems and processes.

Regardless of these differences, the Grimshaw and Wilson study is highly relevant for the purposes of this project. The focus on user needs in relation to research, with a goal of improving support services, directly maps to the previously stated goals of this study to develop an understanding of the information behaviors related to proposal development. Though not a strict example of an investigation of the proposal development experience, the emphasis by Grimshaw and Wilson on “effective consultation” with members of the institutional community complements the user-based design of this study, as does the in-depth study of user experiences at a single institution. While the study described in this thesis builds primarily from the work of Nilan and Fletcher (both in its basic design and through the incorporation of components of the Sense-Making Methodology), the Grimshaw and Wilson study provides specific modern support for the design and employment of a user-based study in the field of research administration.

Thus far, Chapter Two has established the topic of proposal development as important to the field of research administration and the study of information behaviors of faculty as relevant to multiple fields. The next section of Chapter Two includes an exploration of the rise of the user-based study in information studies and is followed by a justification for a user-based study of information behaviors surrounding proposal development as relevant to both the fields of research administration and information studies.



## 2.3 The User-Centered Paradigm

The framing of this investigation in Chapter One, and subsequent identification of models of user behaviors in Chapter Two, have identified the relevance of a user-based design for the purpose of this study. The next section includes a brief exploration of the rise in popularity of user-based studies, and make the case for one particular type of user-based design to investigate information behaviors surrounding proposal development.

Since the 1970s, the information field has witnessed a movement in research methodology from a “systems-centered” to a “person-centered” or user-based approach (Dervin & Nilan, 1986; Taylor, 1986; Wilson, 2000; Courtright, 2007; Dervin & Naumer, 2010; Naumer & Fisher, 2010). A primary focus of the movement has been the investigation of problems or situations from a user-based epistemological perspective. One of the most impactful pieces during the rise of focus on user studies was the 1986 Dervin and Nilan review of post-1978 literature on information needs and uses. The article served as call-to-arms for a user-based perspective, highlighting a need for empirical research of information needs and uses as a new central focus for information systems. This call followed a swath of critical essays supporting information needs and uses as a new central focus for information systems. Specific references to those essays in the 1986 Dervin and Nilan article included an eloquent quote from Garvey, Tomita and Woolf particularly relevant to the practice-based purpose behind this study:

... it becomes increasingly clear that the success of information services is more likely to be achieved through adjusting the services to meet the specific needs of an individual rather than trying to adapt the individual user to match the wholesale output on an information system (Garvey et al., 1979, p. 256).

Per Dervin and Nilan (1986), traditional studies of information needs and uses framed the users as a “passive recipient of objective information” and did not consider the actual construction of the situation by the users or their inherent sense-making capabilities.

Central to this call for a user-based perspective was the inclusion of Dervin’s consideration of time-and-space situated information needs and uses, as associated with the Sense-Making Methodology. Even now, over 30 years after the introduction of Sense-Making, the “user-centered paradigm” emphasizes understanding of information practices from a human standpoint, viewing these practices as a process which takes place within specified situations and contexts (Courtright, 2007, citing Vakkari, Savolainen, & Dervin, 1997; see also Wilson & Allen, 1999).

## **Relevant Models**

The emergence of popular user-based models of information behavior has occurred since the shift in information related research in the 1980s from a “systems-centered” to a “person-centered” or user-based approach (Dervin & Nilan, 1986; Wilson, 2000; Bates, 2010; Dervin & Naumer, 2010). Such models include: Ellis’s common characteristic of researcher information behavior (1993, 2005), Dervin’s original three-pronged model of SITUATION-GAP-USE (Dervin, Jacobson & Nilan, 1982; Dervin, Nilan & Jacobson, 1982; Dervin, 1983), Kuhlthau’s “Model of the information search process” (2004), Taylor’s “value-added” model (1986) and Wilson’s “Information seeking – a generic model” and “Model of information behavior” (1981; 1997).

In 1986 Robert Taylor introduced his “value-added” model as a user-centered lens to investigate the analysis of the “information use environment” and *complement* (rather than contradict) traditional content and technology-driven approaches, stressing the

“user-driven approach as a major input to systems design” (1986, p. 2). Per Taylor, the user-driven approach adds value by its recognition and analysis of information use environments (IUEs), defined as “the set of those elements (a) that affect the flow and use of information messages into, within, and out of any definable entity or group of clients; and (b) that determine the criteria by which the value of information messages will be judged in those contexts” (p. 24). Taylor recognized “elements” to include notions of contexts and groups as variables in the equation of utility or “value” of information to users. In Taylor’s case, problems like proposal development are clustered into IUEs. Using a memorable physical analogy, Taylor likened the use of content-driven and technology-driven approaches to systems investigation and design without an incorporation of the user-driven approach, to the building of a stool with only two legs (p. 210).

Of Taylor’s model in particular, Durrance, Souden & Fisher (2006) noted “the essence of [the] model is its framing of conditions associated with information use” (§ 7). There are two specific purposes for the melding of Taylor’s theoretical outlook on information needs and uses with Dervin’s Sense-Making Methodology. Taylor gives credence and special attention to the utility of information to users for a task, which infers stakeholder relationships, in that assorted users may have the same “stake” in a similar task (e.g., proposal development), and thus the information systems designed to support delivery of said information should be considered the value-in-context of that information (the information use environment). He also further emphasizes the importance of situational characteristics, noting that anything that constrains or assists (hurts or helps, for Dervin) the flow and use of information should be considered integral to the

consideration of that situation or environment in terms of information services and resources. Taylor's information use environments, while helpful in setting the stage for a user-based investigation, do not however provide a method for the investigation of user information needs and uses.

A different influential model of information behavior emerged prior to Taylor's, bringing with it a novel method to add to its theoretical contribution.<sup>19</sup> Dervin's three-pronged model of SITUATION-GAP-USE was originally introduced in 1983 along with specific methods for observing monadic users. These methods for studying individual users are pertinent and generalizable across users because of the similar assumptions held (see Chapter One for a description of these assumptions). Dervin's model and methods are also complementary to Taylor's conceptualization of "problem" in her description and use of "situation." Michael Nilan, a collaborator of both Robert Taylor's and Brenda Dervin's, saw these concepts as amenable; Nilan used both separately in his own work (Nilan, 1992; Dervin & Nilan, 1986) and with D'Eredita combined the two as problem/situation or situations/problems (Nilan & D'Eredita, 2008). This study adopted the Nilan and D'Eredita hybrid of problem/situation to characterize proposal development as a problem situated in time and space and as a preliminary product of sense-making constrained by past experiences (D'Eredita & Nilan, 2007) for faculty, as the primary "user" population for research administration.

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<sup>19</sup> Savolainen (2007, p. 118) identifies Taylor's model as at a "crossroads" of information practice and behavior and Dervin's as impossible to reduce to mere information behavior due to the greater complexities of sense-making (citing Wilson, 1999); an observation later reinforced by Dervin's identification with the term "information practice" (Dervin, 1999).

## **Application of User-Based Studies to Research Administration**

In Dervin and Nilan's call for a paradigm shift (1986) from the traditional approach for studying information behaviors to the alternative user-based approach, the dichotomous differences between the approaches were identified as follows:

- Focus on objective information (re: something that has constant meaning – information as thing) vs. subjective information;
- Mechanistic, passive users vs. constructivist, active users;
- Trans-situationality (re: static, across-time-space models) vs. situationality;
- Atomistic vs. holistic views of experience;
- External behavior vs. internal cognitions;
- Chaotic vs. systematic individuality.

Many of these differences have application to this study. Research administration is a compliance-based service industry, where the design and delivery of information services and resources are primarily influenced by both federal regulations (Chronister & Killoren, 2006; National Science Foundation, 2010a, 2010b; EDUCAUSE, 2010) and institutional policy. The federal regulatory environment determines such proposal development specifics as allowable charges (budget items), export controls (travel considerations), and personnel requirements. However, these very drivers of the research administrative structure also represent limitations to activities supported by the structure. As D'Eredita and Nilan note, "policies, rules, norms, cultures, practices, etc. are all functional constraints on problem solving behavior" (2007, p. 29). What is proposed here

– in an effort to enhance the responsiveness of this compliance-driven structure of research administration – is the additional consideration of information behaviors of participants in the proposal development process.

Though the regulatory environment, which necessarily bounds proposal development processes in institutions of higher education, cannot be discounted or ignored, this thesis asserts that the timely delivery of pertinent information can be enhanced by considering the situationally-anchored information behaviors of stakeholders (or “users”) in the proposal development process. These considerations can be accounted for through the adoption of a user-based epistemological position, including application of components of the Sense-Making Methodology. The next section describes this application, including the selection of related data collection methods, chosen for this study.

## **2.4 Application of Sense-Making**

Developed and refined by Brenda Dervin and her colleagues for over thirty years, the Sense-Making Methodology is constructed of both conceptual and theoretical premises, combined with related methods, to interpret how individuals “make sense” of the world around them, including identifying their needs for and uses of information and information resources (Dervin, 1999; Dervin & Foreman-Wernet, 2003; Dervin & Dewdney, 1986; Dervin & Nilan, 1986; Savolainen, 2006; Dervin & Naumer, 2010).

Derived in large part from the situational and constructivist communication works of Richard Carter and his colleagues, Dervin’s Sense-Making attempts to address the “chaos of individuality” by using gap-bridging as a metaphor for the movements (either cognitive or cognitive and physical) humans make in order to deal with uncertainties they

perceive. The individual must make new “sense” in order to move forward in the situation, and it is this making of sense that constitutes the cognitive activities of information-seeking and information-using (Dervin & Dewdney, 1986). Information need is characterized in sense-making through a three-part model known as the Sense-Making Triangle (Dervin & Naumer, 2010) consisting of:

SITUATIONS	The context of the moment in time (time and space) when the user’s (sense-maker) internal sense has run out; included because sense-making is seen by Dervin and others as situational;
GAPS	The gap (operationalized as questions in people’s minds) preventing cognitive movement by the user; the moment of perceived uncertainty – representing an information need, or “gap” to be bridged; the primary component of sense-making;
USES	The use or potential use of the cognitive bridge built by the user to cross the gap in his/her sense; the newly created sense (a.k.a. information helps and hurts); included because “Sense-Making focuses on constructing and does not assume a mechanistic connection between information and use” (Dervin, 1983, p. 6).

Thus, instances of sense-making are situational (i.e., time and space bound in the context of a specific situation/problem) and carried out for the purpose of bridging cognitive gaps<sup>20</sup> through the construction of new sense.

## **Situation**

Situation, as the first element of the Sense-Making Triangle, is of particular concern for this study of proposal development among faculty at IHEs. In some cases in the literature, the term “situation” has been used interchangeably with context, but in other instances it is defined separately (Courtright, 2007). Cool (2000) explains one such differentiation: “contexts are frameworks of meaning, and situations are the dynamic environments within which interpretive processes unfold, become ratified, change, and solidify” (p. 8); and Sonnenwald (1999) generally agrees: “A context is somehow larger than a situation and may consist of a variety of situations; different contexts may have different possible types of situations” (p. 180). For McCreadie and Rice (1999), context is “the larger picture in which the potential user operates; the larger picture in the information system is developed and operates, and potential information exists” and situation is “the particular set of circumstances from which a need for information arises” (p. 58). For the purposes of this study, situation is defined as the user’s positioning (including the combination of circumstances at that time) within the context of work in an IHE.

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<sup>20</sup> Note that the use of the term “cognitive gaps” here is for reader emphasis; however, it is actually redundant in that gaps themselves, in Dervin’s sense, are perceived instances of uncertainty, which can only be said to exist in a user’s perception.



## **Situation vs. Information Use Environment (IUE)**

Because this thesis refers both to Taylor's depictions of the user-centered paradigm and his description of problem, it would be negligent to leave out further explanation of his landmark model of context: the information use environment, or IUE (Taylor, 1991; see also 1986). This model – defined as “the set of those elements that (a) affect the flow and use of information messages into, within, and out of any definable entity; and (b) determine the criteria by which the value of information messages will be judged” (Taylor, 1991, p. 280) – was developed for studying information use of professionals in workplaces. Per Taylor, the value of a user-driven model as an approach stems from its recognition and analysis of these information use environments. There are four elements at the heart of the IUE model which frame conditions of information needs and use: the demographics of sets of people (often professionals) with shared assumptions; the problems these people share and the impact of these problems in information needs; the impact of the problem setting; and the impact of individual approaches for problem solving on information behaviors (Taylor, 1986, 1991; Durrance et al., 2006; Courtright, 2007).

Though these elements complement the considerations of problem/situation, gaps and use as described in this thesis, the historical framing of IUEs does not acknowledge the growing flexibility of information use in the past decade, which in turn detracts from the Taylor's assumptions of predictability of workplace settings. As described in further Chapter Three, this study did not attempt to make assumptions about workplace settings, but instead solicited individualized descriptions of proposal development processes, which allowed for the idiosyncrasies of workplace variations. However, as a practicing

research administrator, the author approached the interpretation of results from this user-based study of information behaviors through a practice-based framework, considerate of the compliance-driven constraints of information provision and service in relation to the proposal development process.<sup>21</sup>

### **Investigating Situation through IUEs and SMM**

Part of this practice-based framework is an acknowledgement of the potentially compounding nature of over-lapping extra-institutional environments (e.g., institutional policies and practices, funder policies and practices, federal regulatory policies and practices). Taylor's original conceptualization of IUEs does not appear to allow consideration for the impact of such overlapping environments. These types of extra-institutional impacts have been considered, however, through empirical investigations of professional populations such as police, journalists, researchers, managers and judiciary employees (see Courtright, 2007 for a specific accounting of these studies). One pertinent example of such research was conducted by Lamb, King and Kling (2003), who studied the informational environments of three types of for-profit industries: law, real estate and biotech/pharmaceuticals. Data were gathered through semi-structured, on-sight interviews, and thematic coding techniques were used to develop data categories for industry-level analysis (p. 102).

Of particular note for the purposes of this study, Lamb et al. specifically included regulations and industry-wide infrastructures as factors of influence for information practices within organizations (Courtright, 2007, p. 278). Limitations in application of the Lamb et al. study – for the purposes of this investigation – concern the sole focus on

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<sup>21</sup> For example, see a recent discussion started by EDUCAUSE (2010) resulting from National Science Foundation report NSF10-077, 2010.

online information use, and the lack of a coherent epistemological position. However, though the Lamb et al. study did not include academic institutions among its investigation in law, real estate and biotech/pharmaceuticals, this study of information behaviors in IHEs meshes with the focus of Lamb et al. on highly technical and highly institutional environments. In fact, research-intensive IHEs today (such as the one selected for the research site of this study) fit with the patterns of “intensive” information use, as characterized by Lamb et al. as having “staffed library or research department, online service contracts and high reported online usage, local and wide area networks, records management systems, some use of public and industry information infrastructures” (p.102). Thus Lamb et al. provides additional support for the investigation of information behaviors as situated in an institution of higher education.

The conceptualization of proposal development as a problem/situation for this study represents a melding of the institutional use environments of Taylor with the situationally-focused sense-making of users from the SMM, which is used to recognize and promote the user-based study of information behaviors surrounding this complex activity in a complex institutional environment. Since information needs and uses are conceptualized as situational in SMM, it would seem to imply the implausibility of successfully investigating the “unbearably unique” and highly detailed needs and uses for a particular situation or group (Dervin & Dewdney, 1986). However, Dervin (1983, 1999); Dervin et al. (2006); Souto et al. (2008); and Nilan & Fletcher (1987) have all promoted user-based approaches as a means to diagnose relevant and universal aspects of information seeking, needs and uses.

The transferability of unique situations to universal aspects is made possible due to the presence of generic aspects in all situations of sense-making, as proven through numerous empirical studies (Dervin, Nilan & Jacobson, 1982; Newby, Nilan & Duval, 1991; Nilan & Mundkur, 2007). These “universals” are uncovered by using the Sense-Making Methodology to focus on “movement through time-space” – a characteristic which inhabits all situations on information seeking and use, no matter the subject or user (Dervin, 2003c/1997; Dervin & Dewdney, 1986; Dervin, Jacobson & Nilan, 1982; Dervin & Naumer, 2010).

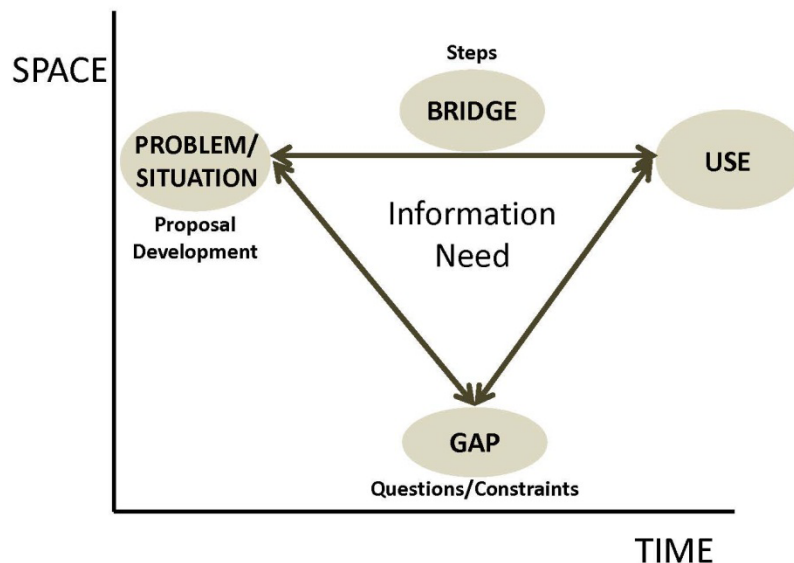
The conceptualization of problem/situation – described earlier in Chapter One, and defined as a time/space context for human cognitive behavior, as a preliminary product of sense-making, constrained by the past experiences of an individual – is drawn from Nilan and D’Eredita (2008), and the application of SMM to the process of proposal development builds upon the work of Nilan and Fletcher (1987). However, the practitioner-based lens and application of this concept and related methods (discussed further in Chapter Three) to the field of research administration is a novel contribution from this study.

### **Situation-Gap-Use**

The relation between and operationalization of the component of the Sense-Making Triangle have been briefly discussed in Chapter One and earlier in Chapter Two. The “problem” is the user’s situation, as anchored in a particular time and place, and “refers to those events in a person’s life that create the context for a lack of sense, or a gap, i.e., an occurrence that raises questions” (Dervin & Dewdney, 1986, ¶10). The gap

represents a halt in a user's movement through a situation – a perception of uncertainty – which is commonly related in the literature to information needs (Dervin, 1983).

This “gap” in understanding was operationalized in this study as questions raised in the minds of a user or constraints perceived by the user when trying to move through the situation, which were identified during the interview process. The movement by the user to “bridge” or close the gap may be cognitive, or cognitive and physical, and was operationalized in this study as steps taken by the user. The answers to the questions are influenced by the users' expectations for how they will help their situation, and represent the last of the three main elements in the triangulated sense-making process. Figure 2.4 presents a representation of the Sense-Making Triangle as applied to this study. The third element of the triangle, use, was not explored sufficiently for inclusion in the results of this study.



**Figure 2.2: Sense-Making Triangle as Applied to an Investigation of Proposal Development** (Adapted from Souto, 2007 and Souto et al., 2008)

In a recent examination of the informing practices of knowledge workers, Souto et al. (2008; see also Souto, 2010) affirmed the importance of “situationality” in consideration of information needs and uses of for-profit information workers, for the purpose of design improvement. The study called for a shift from a traditional focus on static, cross-time variables as influencers for design.<sup>22</sup> Souto, Dervin and Savolainen (2008) prescribed a different approach to user studies, emphasizing “users-acting-in-situations” and a time-space bound emphasis, noting that traditional methods can only capture “habit patterns, inflexibilities, and responses to rigid system constraints,” while the proposed method can detect predictable changes in and flexibilities of human behavior (§13).

Therein lies the specific applicability of the Souto et al. study for the purposes of this thesis. The study plays down what have – for a significant period of time – served as predominant determiners of information resource provision: organizational characteristics, demographics, and task-based factors. These are also all types of static characteristics of a proposal development situation, which while still considered influential to the related organization and provision of information services and resources, are provided – in similar fashion to Souto et al. – as secondary elements of consideration in the study of information behaviors. In the case of this study, the problem/situation is proposal development, which is described through the steps the users (faculty) take to address gaps (questions/constraints) they experience during the development of a proposal. The situation is modeled as a temporally-ordered aggregation of the steps (cognitive, or cognitive and physical) taken by the respondents, in an effort to

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<sup>22</sup> These are referred to as the “nouns that drive [systems] – business processes, person hierarchies, divisions, task, type of document and topics,” all elements which have been popular foci of “user studies” which “miss the mark” (Souto et al., 2008, §10).

describe the situation in a manner reflective of actual user experiences and in the terms of the user.

A definitional problem of information needs (occupying the center of the Sense-Making Triangle, as shown above in Figure 2.4) has been recognized as:

- A mistaken emphasis of what systems provide rather than what the users need (Dervin & Nilan, 1986; Nilan & Fletcher, 1987);
- The trouble users have in identifying their needs in relation to systems' framing (see also Taylor, 1962);
- The demographic and/or organizational characteristics of the user (Souto et al., 2008);
- The evolvment (change) of information needs of users during their progression through a problem/situation; and
- The lack of consideration for the intended use(s) of information (posed by Nilan & Fletcher, 1987).

The employment of the Sense-Making model of situation-gap-use for this study addressed this definitional problem of information needs by focusing on time-space bound rather than across-time-space characteristics of information needs, as defined by the user's description of cognitive movements (or lacks thereof) during the problem/situation of proposal development.

## **Summary**

Like academic librarians, research administrators in IHEs face the daily challenge of meeting the changing needs of diverse academic disciplines. Discussions of service

implications for information-based academic units serving multiple disciplines have occurred in many information and library science venues (see for example Birdsall, 2009; Palmer et al., 2009; and a review of such pieces in Herman, 2001). However, the study of information needs specifically during the proposal development process has not been directly addressed.

As referred to earlier in this chapter, a goal of this study was to provide additional considerations for the design and delivery of information services and resources regarding research administration through the investigation of time and space situated needs as delineated by users' perceptions of cognitive movement through the "problem" of proposal development. The identification of such needs, as situated in time and space, was a primary focus of this user-based study of information behaviors, while traditional across-time-space characteristics (such as demographics and organizational roles) were relegated to a secondary focus – as ingredients for sample selection – described further in Chapter Three.

And why are behaviors useful for studies concerned with information services and resources? As originally emphasized by Dervin and colleagues (see for example Dervin & Nilan, 1986; Nilan & Fletcher, 1987), individuals who are addressing a similar problem/situation always tend to do similar things, regardless of demographics. Not only have patterns been found in how people address their problem (behavioral patterns), but also in the time order in which they do things in response to similar problems (temporal patterns). For example, Nilan and Fletcher (1987) – a study of researchers funded by the National Science Foundation (NSF) – found patterns in what people were doing (cognitive actions and physical behaviors related to proposal development) *and* in the



sequence in which they did them, even though the study involved individuals from different disciplines, institutions, and even types of organizations.<sup>23</sup> It is this manner that the study described in this thesis attempted to look for similarities in situations of proposal development – across a wide range of traditional static characteristics (e.g., demographic information) – in order to determine the potential value of such information for informing the field of research administration and to expand successful application of user-based studies of information behavior to the researcher’s areas of practice. The next section of Chapter Two further discusses the combined academic and practitioner purposes for this study.

## **2.5 Purpose for Study**

The research project described in Chapter Three is an intent to investigate information behaviors surrounding proposal development in order to shed light on the actual process taken by users (rather than the “fit” of these processes into traditional compliance-based institutional procedures), as well as to understand the needs experienced during the process in relation to their time and space in the process. While Chapter Three lays out the design of this study, Chapter Four provides evidence that – through a user-based investigation of information behaviors – traditional static characteristics associated with the faculty experience of proposal development do not provide an adequate basis for predicting information needs in relation to the experience. Instead, by conducting a holistic examination of the proposal development experience, from the eyes of and through the words of users, this study contributes to the fields of information studies and research administration by identifying patterns in the steps taken

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<sup>23</sup> Note that the Nilan and Fletcher study (1987) was not limited to faculty in higher education, but included researchers from different organizations and individual researchers who had recently been funded by NSF.

by users during the process. These patterns have been employed to create a dynamic, iterative model of proposal development, also presented in Chapter Four. The purpose of such pattern identification is to enable insight into the information behaviors of faculty, experience that can then be shared and employed to design, organize and/or facilitate responsive information services and resources, to provide users what they need, when they need it during the development of proposals for external funding.

A user-based investigation of the information behaviors surrounding the “problem” of proposal development in this manner derives support from both Dervin’s Sense-Making and Taylor’s discussion of user-driven “value-added” models. Per Taylor (1986), the “user-driven model is one way of deriving problem-related information as input to the design of systems and their operation” (p. 9). Though direct purpose of this study was not to design a system based on study results, the intent to derive information about the problem/situation of proposal development – in order to inform activity surrounding the situation – was the same. In fact, for the purpose of this study, proposal development support could actually be viewed as a subset “system” of research administration, whereby the system follows Taylor’s broad definition of any formal set of value-adding processes, including machine and human-based components, designed to provide information to a set of users (p. 10).

As described thus far in Chapter Two, existing literature exists on information behavior models, information behaviors of faculty (of various disciplines), and proposal development in higher education. For example, many studies have been conducted to assess the changing needs of faculty, and academic institutions in general, for tools and resources to support new scholarship (see, for example Obendhain and Johnson, 2004;

National Academies et al., 2005; American Council of Learned Societies, 2006; Housewright and Schonfeld, 2008; Palmer et al., 2009). But apart from Nilan & Fletcher (1987) and Grimshaw & Wilson (2009), there is little empirical work that investigates the information behaviors of faculty during proposal development. This identified disparity in research is to the detriment of those who seek to facilitate proposal development in IHEs, namely research administrators, and to those who fund such efforts (the institutions themselves).

One of the primary purposes behind this investigation of information behaviors surrounding proposal development was to explore a method for enabling the provision of applicable and timely services and resources to users during the process. The need for providing accurate information to “users” – most commonly faculty, as described earlier – is a given in the field of research administration. However, this study puts forth the additional consideration of the “timeliness” of information delivery, as an effort to decrease the signal-to-noise ratio caused by the modern day glut of information resources, applicable to virtually any information service field today.

Taylor (1986) identifies “noise reduction” as one of the six categories of user information choice criteria (including ease of use, quality, adaptability, time-saving and cost-saving), a concept not completely foreign to research administration in terms of system design.<sup>24</sup> For Taylor, the exclusion of certain kinds of information, as one element of noise reduction, is to contain the amount of relevant information without denying access. Precision, as another element of noise reduction identified by Taylor, refers to the capability of a system to help the user find exactly what is wanted (a common concept

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<sup>24</sup> For example, see Zimmerman et al. (2003) which describes the development of an e-mail system for faculty to ensure the delivery of only “timely and relevant funding opportunities” in an effort to reduce noise, identified as “unwanted e-mail” (p. 3).

in information retrieval). By focusing on the specific time-in-space information behaviors of faculty during the proposal development process, rather than relying solely on “such static attributes as demographic, psychological, and geographic descriptions of users, all conceptualized as across time-space identifiers” common to user studies (Souto et al., 2008, p. 4), this study contributes a potential method of noise reduction for the design of proposal development support systems, in effect helping to predict what information will be valuable at what points during proposal development and submission.

## **2.6 Chapter Two Summary**

In this Chapter, a brief overview was given of the wealth of gray literature, trade publications surrounding proposal development, empirical research on information behaviors in higher education, and more specifically a few select studies concerning proposal development. The topic of proposal development was shown as one of current interest and significance to the fields of higher education and research administration, and the groundwork was laid for positioning a user-based study on proposal development as significant to the field of information science. The chapter included discussion of the scarcity of theoretical applications to proposal development and the application of the Sense-Making Methodology as a framework for investigating and describing proposal development – which was framed as a problem/situation in the spirit of Dervin, Taylor and Nilan and D’Eredita.

This study asserts that an examination of the information behaviors related to proposal development – specifically in the realm of higher education – can enhance research administration through developing an understanding of the “user” experience. Increased understanding of the process in this manner can contribute to interactions

between research administrators and faculty surrounding proposal development situations and potentially to the development of collaborative, dynamic and responsive information services and resources.

As framed by the discussions described above in the trade publications of the profession, research administration has recognized the increasing burden of proposal development in IHEs. This burden is greatly a reflection of the complexity of the process. During the literature review, however, little evidence was found of other investigations of information behaviors as a means to describe and alleviate these burdens. The study described in this thesis attempts to address this disparity through a user-based investigation of information behaviors surrounding proposal development. Chapter Three will specifically describe the design and application of a user-based method for conducting an in-depth investigation of the problem/situation of proposal development.

## CHAPTER THREE: Methods for Study

### 3.1 Introduction

Despite the importance placed on research development at modern institutions of higher education,— as demonstrated by the popular literature reviewed in Chapter Two, as well as the growing body of administrative positions and fiscal resources devoted to this purpose – there has been little investigation of the information behaviors surrounding the proposal development process. Without research development, and on a more elementary level, *proposal development*, the field of research administration would probably cease to exist. And without the provision of appropriate, timely and accessible information resources, institutions of higher education (IHEs) cannot successfully support proposal development.

An investigation of information behaviors surrounding the proposal development process is a logical primary step towards the improvement of research development support, and thus of direct concern for the field of research administration. Chapter Two discussed the conceptual framework for this study, identifying the Sense-Making Methodology (SMM) as a starting point for theoretical applications in this study. Nilan and Fletcher (1987) was also identified as an applicable study of information behaviors during proposal development from which to build on for this study. Chapter Three will now lay out the objectives, framing and methods for conducting a descriptive study of the information behaviors surrounding proposal development in an institution of higher education, as applied for this thesis.

## 3.2 Objectives and Framing of Study

### Objectives

In Chapter One, the following guiding research question was provided: *How can a user-based investigation be employed to define and describe information behaviors during proposal development?* Based on this research question, the objectives of this study, which builds upon the Nilan and Fletcher (1987) study of proposal development among NSF-funded researchers, were to:<sup>25</sup>

- *Demonstrate a user-based investigation of information behaviors surrounding proposal development as a means to support this important activity in IHEs;*
- *Investigate the information behaviors of faculty during proposal development activities, through the development and employment of a user-based step model;*
- *Determine the gaps in understanding (operationalized as questions and constraints) that faculty experience in relation to those steps; and*
- *Employ the findings from the investigation to make recommendations to research administrators for addressing the problem/situation of proposal development.*

The next section of Chapter Three discusses the framing of this investigation in regards to the researcher's area of practice – research administration – and provides justification for the chosen methods.

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<sup>25</sup> “Descriptive” is used in the sense of investigating: What is happening? How is something happening? Why is something happening? (Mid-continent Research for Education and Learning, & Education Commission of the States, 2004).

## **Framing of Study**

The profession of research administration (the researcher's area of practice) is entrenched in an ever-expanding set of policies, regulations, and ethics – riddled with its own vernacular terminology and fed by a common body of knowledge.<sup>26</sup> The methods and standards of the profession are perhaps less fixed. Though research administrators (RAs) as a whole seek to network, share, and homogenize their institutional methods for the better of the business (in most cases, research at institutions of higher education), the standards and methods may vary greatly by institution, largely due to the variation in size of each institution and related size and capabilities of the administrative substructure. Regardless of this variety of methods and standards, as a whole the profession of research administration is highly bound by federal policies and regulations (including those regarding research ethics), which determine the nature of operations for most if not all U.S. nonprofit and for-profit institutions that employ sponsored research.<sup>27</sup> However, offices of research administration also exist primarily to facilitate and support the efforts of faculty and students at their respective institutions to secure and maintain external funding in support of research. This study was formulated, in part, in response to this service-vs.-compliance tension common to the field of research administration.

Dervin's Sense-Making Methodology (SMM) has been developed as an approach to inform research and practice, by studying informants by whatever names they may be called – e.g., audiences, viewers, users, listeners, readers, patrons, constituencies, patients, farmers, citizens, employees, informants, customers, colleagues, community

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<sup>26</sup> In fact, the BOK (Body of Knowledge) is a popular electronic information repository for problem solving and professional development, sponsored by one of the profession's organizations.

<http://www.srainternational.org> or

<http://www.networkingnirvana.org/NETWORKINGNIRVANA/NETWORKINGNIRVANA/BOK>.

<sup>27</sup> For various discussions of these considerations, see Kulakowski & Chronister (2006).



members, welfare recipients, pregnant mothers, and so on. It has been simultaneously developed as an approach to the development of responsive (or dialogic) systems or procedures to be used by institutions mandated to communicate in some way with these informants as constituencies (Dervin, 2008, p. 3). This research study – based in practice and informed by Sense-Making – recommends, describes and employs a method for enhancing the traditionally compliance-based field of research administration through a user-based empirical investigation and application of information behaviors in proposal development, including the processes and perceptions of faculty surrounding this common activity.

Proposal development experiences entail a wide variety of inter- and intra-personal interactions. As part of these interactions – both internal within the proposer’s mind, and external, between faculty and departments, schools, administrative offices, funders, etc. – answers to questions and solutions to constraints are sought. As a practicing research administrator whose focus is the proposal development process, this researcher investigated steps taken by individual faculty during the process to determine what types of questions are asked when (“asked” being a relative term, as the asking can occur to oneself) and what constraints are experienced, *in order to better understand the process for assisting individuals in daily practice* and to contribute to a larger conversation on how to improve services in the industry.

The style of investigation and analysis were purposely selected in order to capture *in vivo* descriptions from faculty (selected as one of a group of stakeholders in proposal development in IHEs, but characterized as “users” for the purpose of this study) of their situations surrounding proposal development and their perceived gaps in understanding

(operationalized through questions and constraints) during this process. By listening to, then re-presenting the experience in the words of the user, this investigation provides a bottom-up (user-based) representation of the process, rather than a top-down (traditional) assessment of proposal development as an expert. The very act of collecting and analyzing the data in this manner provided a new perspective of the process to the researcher – a perspective which the researcher hopes will also inform the field of research administration.

### **3.3 Research Design**

#### **Phases of Study**

The conceptualization, design and conduct of this research study occurred over approximately a two-year period, incorporating five distinct but interrelated, consecutive yet sometimes comingled phases. Phase 1 incorporated the design of the overall study; Phase 2 the design, testing and approval of the study instrument; Phase 3 the preparations for and process of data collection; Phase 4 the preparations for and process of data analysis; and Phase 5 the interpretation and write-up of study results. Table 3.1 details the order and length of primary activities of these phases in relation to each other. The design and deployment of the research study are detailed in the next section, beginning with a discussion of the identification of faculty as the user of interest and the selection of the research site.

**Table 3.1: Phases of Study**

	May'09- May'10	July'10- Aug'10	Sept 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011	Feb 2011	Mar 2011	Apr 2011
<b>PHASE 1</b>										
Determine topic										
Conduct Literature Review										
Identify Methods										
Design Study										
<b>PHASE 2</b>										
Create/Revise Interv. Protocol										
Pilot Test Protocol										
Apply for/Receive IRB Approval										
<b>PHASE 3</b>										
Create/Revise Data Matrix										
Identify/Expand Sample Pool										
Contact Potential Participants										
Conduct Interv./Write Observ.										
Enter Data and Review										
<b>PHASE 4</b>										
Create/Revise Physical Matrix										
Create/Revise Model										
Code/Recode Data										
Analyze & Interpret Data										
<b>PHASE 5</b>										
Write/Rewrite Results										
Consider Implications										

## Identifying the User in Research Administration

There are specific considerations for offices of research administration that impact the development and provision of information services and resources. These include issues of compliance with federal regulations;<sup>28</sup> issues of fiscal accountability to local, state, and federal funding sources; and mandates of institutional protocol (often concomitant to the first two issues). While often mired by concerns of compliance with

<sup>28</sup> For an example of these burgeoning concerns, the National Research Board recently announced a new requirement of data management plans to be included in all NSF proposals as of October, 2010 (National Science Foundation, 2010a). This new requirement is yet another example of results from public calls for transparency of spending for tax-dollar funded activities and is part of “a growing trend on the part of government agencies to require researchers to plan for the preservation and sharing of the data produced by publicly funded research” (EDUCAUSE, 2010). Part of the underlying purpose for this research study was to answer the question: How can universities help their researchers meet these expanding requirements?

federal regulations and constrained by related institutional operations, the field of research administration is also concerned with usefulness, timeliness, accuracy and accessibility of the information it provides. Existing information services and resources provided by research administrators in IHEs are designed and delivered in conjunction with the business requirements of two other stakeholders in proposal development (apart from faculty) – the submitting institution, and the federal government. All the while, little insight into or regard for the information needs and uses is given to the primary users of those tools: the faculty.

In an edited volume of essays analyzing the governance of higher education in Europe, Amaral, Jones and Karseth (2002) discuss the role of stakeholders in higher education. Working from Freeman’s classic management definition of a stakeholder (1984), Amaral and Magalhães define a stakeholder as “a person or entity with a legitimate interest in higher education and which, as such, acquires the right to intervene” (2002, p.2). This conceptualization of stakeholder helps to address the various and often competing internal or exterior entities but is intrinsically connected to the university structure (Reed, Meek & Jones, 2002). In particular, Amaral and Magalhães’s (2002) identification of internal and external stakeholders – members of the academic community and individuals or entities outside of the university, respectively – is helpful in correlation to the multiple internal and external stakeholders in higher education proposal development. While many types of internal stakeholders have already been discussed indirectly in this proposal, there are also potentially multiple external stakeholders for the proposal development process in higher education. Table 3.2 below shows a list of potential internal and external stakeholders in IHE proposal development.

**Table 3.2: Internal and External Stakeholders in Higher Education Proposal Development**

Internal Stakeholders	External Stakeholders
<b>Faculty</b> <b>Students</b> <b>Department</b> – staff, administration, and as an entity <b>Center or Institute</b> – staff, administration, and as an entity <b>School or College</b> – staff, administration, and as an entity <b>Centralized research administration</b> <b>Institution</b> – additional related staff, administration, and as an entity	<b>Collaborators</b> – other institutions, nonprofits, and businesses (and their staff and administration), as well as individuals <b>Funder(s)</b> – staff, administration, and as an entity <b>Community</b> – parties of interest, including local, state or specific social types <b>Federal government</b> – as regulatory entity

Much like Amaral and Magalhães’s purpose for stakeholder identification (2002), developing and maintaining an awareness of both the internal and external stakeholders involved in each proposal development instance can help research administrators gain flexibility in responding to the environmental needs and changes experienced by the institution and its constituents on an ongoing basis. Yet knowing who the concerned parties are is not enough. In order for offices of research administration to develop more dynamic and flexible information services and resources in IHEs, a method is needed to investigate the information needs and uses of faculty as the stakeholder group who is most often served by these services and resources.<sup>29</sup>

Offices of research administration serve both the greater institution in which they are housed and the overarching regulatory “institution” to which they answer (the federal

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<sup>29</sup> Monahan & Pascucci (2011) also provide a recent characterization of faculty as the key stakeholders for offices of sponsored research, as well the identification of additional stakeholders such as institutional leaders and funders.

government). They also serve the individuals of the home institution, including administration, staff and the faculty who serve as primary investigators for grants proposed and secured by the institution. In fact, faculty members are most often the primary “customer” of research administration services. However, customer is not a term regularly employed for faculty members by research administrators. Instead, they are most often referred to as “faculty” – though they represent a form of customer or client for this field. Rarely, if at all, are they referred to as “users” either in offices of research administration or in the professional literature. However, for the purpose of this study, faculty represent the user group of interest and investigation.

There are multiple reasons for focusing the interview – at this time – on faculty, rather than including other stakeholders (such as university administrative staff) in proposal development at IHEs. The first reason was to provide a new focal point of investigation. As a practicing research administrator, the researcher has been immersed for years in a constant process of learning and experiencing the needs and information usage surrounding the grant development process from a service point of view.

Focusing on faculty – or the *user*, or service customer – provides a significant contribution to the researcher’s area of practice (research administration) in general, as well as to increasing the researcher’s own awareness of the totality of information needs and uses surrounding the proposal development process. Focusing on the faculty for this investigation also allowed for a richer, more intensive investigation of one set of stakeholders in the process, rather than a broad, more cursory outlook at multiple stakeholders. This style of investigation was also supported through the selection of a

single institution of higher education as the site for the study, a decision which is discussed in the next section.

## **Research Site Selection**

To investigate the information behaviors of faculty surrounding proposal development, multiple designs were considered. As discussed in earlier in Chapters Two and Three, the selected data collection and primary analysis methods for this study were drawn from the Sense-Making Methodology. This included in-depth interviewing with a select user population in an institution of higher education. This method could have been employed in a broad-based investigation conducted over multiple locations; however a single site was selected to conduct the interviews in order to develop a deep cross-disciplinary profile of information behaviors at a single organization. This choice was supported by established studies with this design (Ellis, 1993; Grimshaw & Wilson, 2009), but was also influenced by the limitations of the researcher – as a full-time practicing research administrator. Benefits and drawbacks of both designs were considered, including negotiations of time and participation.

The selection of a single institution enabled the researcher to immediately integrate what was learned into daily practice, as well as to provide a strong basis for planning subsequent investigations within the same institution or across institutions. Practitioner-led investigations of single institutions are also looked upon very favorably by the cognizant professional organizations of the field of research administration, and publications for such studies are strongly encouraged in the peer-review literature of the field. In addition, a study designed in this manner enabled a concise demonstration of the

applicability and utility of a user-based approach to investigating information behaviors in research administration.

The research site is a large, private institute of higher education (IHE) with over 981 full-time faculty members and over \$79 million awarded for research, teaching and other sponsored programs in fiscal year 2010.<sup>30</sup> The researcher is employed by the Dean's Office of one of the larger schools of the institution and as such has immediate access to over 150 full-time faculty. In addition, at the time of the study the researcher was currently a graduate student of a second school within the institution, providing unencumbered access to more than 40 additional full-time faculty members. This level of access was taken into consideration during the development of a robust interview protocol, as drawn from methods exemplified by Dervin's Sense-Making Methodology (1983, 1999, 2008). The next section of Chapter Three discusses the selection and appropriateness of interview methods for this study and provides a description of the interview protocol.

### **3.4 Data Collection Techniques**

#### **Establishing Appropriateness of Selected Methods**

This study was designed to elicit a wide range of details and perspectives on information behaviors during proposal development and submission, through selection of methods to support such elicitation. In-depth interviewing was selected as the data collection method, in order to provide detailed descriptions of the "problem" of proposal development. The method of interviewing was based in large part upon the Sense-

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<sup>30</sup> Information for 2010-11 academic year, as accessed from <http://www.syr.edu/about/facts.html>



Making Methodology, in order to provide a sound methodological basis for the interviews (Dervin, 2008). For the purpose of this research, interviews were preferable over other methods, such as experiments, for the following reasons:

- Experiments would be highly difficult, as the factors central to the research problem (Leedy & Ormrod, 2005, p. 88) would be virtually impossible to control for if an experimental research design were employed. The day-to-day business activities of a sponsored research office can be predicted to a point; however, the natural fluctuations of staff, faculty, grant opportunities and student interactions make a prolonged controlled experiment utterly impractical, and any short-term experiment surrounding research administration is unfathomable for both appropriate purpose and tactical delivery;
- Random assignment could be unethical, if a positive service is withheld from one group but not another – even for the purpose of measurement, such treatment could be argued as preferential. Also, ensuring homogeneity between groups would be difficult, due to the wide variation of extenuating circumstances surrounding each proposal development instance and the faculty served (a critical point for this thesis);
- Close-ended surveys or interviews would not provide enough detail to account for the basic nature of the phenomena – the *human nature* and resultant complexities involved in a continuously operational research environment.

Heuristics were another strong reason to rule out experimental design for this study.

Based on the interviewing concepts behind time-line interviewing as drawn from the

Sense-Making methodology, user experiences (as expressed in the language and terms of respondents) are seen as the most effective means of collecting and interpreting information behaviors. The language of respondents played an integral role to the examination and explication of the problem/situation of proposal development for this study.

The particular applicability of interviewing methods drawn from the Sense-Making Methodology (Dervin, 1983; 1999; 2008) lies in the potential for informing both research and practice through the co-orientation of one individual's experience (the user) with another's (e.g., the researcher or practitioner). A user-based study conducted in this manner provides for the bottom-up, empirical investigation and application of information behaviors – including the processes and perceptions of faculty surrounding this common activity. The intent of this study was to inform and enhance the compliance-driven field of research administration through the application of user-based methods in an investigation of the information behaviors surrounding proposal development.

## **Interview Method**

As introduced previously, in-depth semi-structured interviews were used to investigate the steps taken by faculty during proposal development and the questions and constraints experienced in relation to those steps, with a focus for this study on faculty from one research-active institution of higher education (IHE). This study used the most well-known application of the Sense-Making Methodology in the employment of the interviewing approaches drawn from the methodology (Dervin, 2003e/1984; Dervin & Naumer, 2010). A modified Micro-Moment Time-Line Interview technique (Dervin,

1983, 1999, 2003a/1980, 2003d/1981) was employed to address the multiple purposes of this proposal – to determine the applicability of a user-based study to examine information behaviors in research administration and to define and describe the process of proposal development with said approach, in order to inform the community tasked with facilitating this process.

The time-line interview traditionally incorporates the elements of the Sense-Making Triangle – Situation, Gap and Use (as discussed in Chapters One and Two). In Sense-Making, steps are the sequential cognitive movements of an individual – as situated in particular times and places during the individual’s experience – in pursuit of a particular end state or goal (Nilan et al., 2004; Nilan & D’Eredita, 2008). Time-line interviews (Dervin, 1983, 1999, 2003a/1980, 2003d/1981) were developed to tap cognitive information seeking and use behaviors situated in time and space. This technique has been employed once before in an empirical study involving proposal development (see Nilan & Fletcher, 1987).

The very nature of an in-depth interview speaks to a potential mixed-method approach to data collection and analysis. Schutt (2006) notes, for example, that the benefits of in-person interviews include: longer, more complex queries with both open- and close-ended items; the ability of the interviewer to guide the sequence of the interview; and the ability to observe the social and physical context (and include it in analysis, if relevant, in terms of field notes) (p. 268). Though Schutt was speaking of interviews for “survey” research, these same observations hold true for other interview guides or protocols. By employing a modified Micro-Moment Time-Line Interview (Dervin, 1983, 2003a/1980, 2003d/1981) technique for this study, collaborative

discussions were developed between the respondent and interviewer, enabling rich details to be probed for by the interviewer and expressed by the respondent, rather than forcing the respondent into pre-formatted responses. As such the time-line based interview method provides a content-free structure to elicit respondent descriptions of their cognitive movements (Dervin, 1983; Nilan & D'Eredita, 2005).

This method allowed for the generation of a cognitive model of the proposal development process – an appropriate choice based on the conceptual framing of the study within the Sense-Making Methodology (specifically employing Dervin's model of situation-gap-use) and the formation of problem/situation through Nilan & D'Eredita's (2008) hybrid of Dervin's conceptualization of situation (see Dervin, 2003a/1980 for brief description), and Taylor's complementary conceptualization of "problem" within information use environments (1986, 1991). This study adopted this conceptualization of problem/situation for the purpose of characterizing proposal development as a problem situated in time and space, for faculty as a primary "user" population for research administration.

### *Interview Design and Item Construction*

The study employed in-depth semi-structured interviews of full-time faculty at Syracuse University who recently (within 18 months prior to the study) submitted a grant proposal. Traditionally, semi-structured interviews employ an interview guide or protocol, with topical areas outlined and/or specific items scripted. The protocol developed for this study included a script of sequential items, with flexibility to

acknowledge new topics introduced by interviewees<sup>31</sup> and the allowance of open-ended commentary by respondents near the end of the interview – a common element of semi-structured interviews (Kvale & Brinkman, 2009).

The goal of the interview protocol, as designed, was to link the thematic research question, which set up the conceptual categories from Sense-Making (steps, gaps and uses), with good *dynamic* interview questions – those which “promote a positive interaction, keep the flow of the conversation going, and stimulate the subjects to talk about their experiences and feelings” (Kvale & Brinkman, 2009, p. 131). A sequence of steps in the proposal development process was collected from the respondent. This sequence was then used as a memory aide to prompt the recall of the questions and constraints<sup>32</sup> experienced by the respondent at specific points during the development of a proposal.<sup>33</sup>

The actual protocol for this study is included at the end of this document in Appendix B. Note that italicized text enclosed in carrots (<< >>) is an instruction or a reminder for the interviewer; everything in quote marks (“ ”) is what the interviewer actually says to the respondent. Non-italicized texts without quotation marks represent interview and data management cues.

The interview protocol was divided into four primary sections:

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<sup>31</sup> For example, one respondent wanted to discuss (repeatedly) what he saw as the biggest factor to consider when he was determining whether or not to develop a proposal – time. He noted that he would not bite on a proposal unless he has two months to prepare for it, that he was not going to waste his time, and that he does not do last minute things. These comments were acknowledged by the researcher and noted for potential implications for analysis.

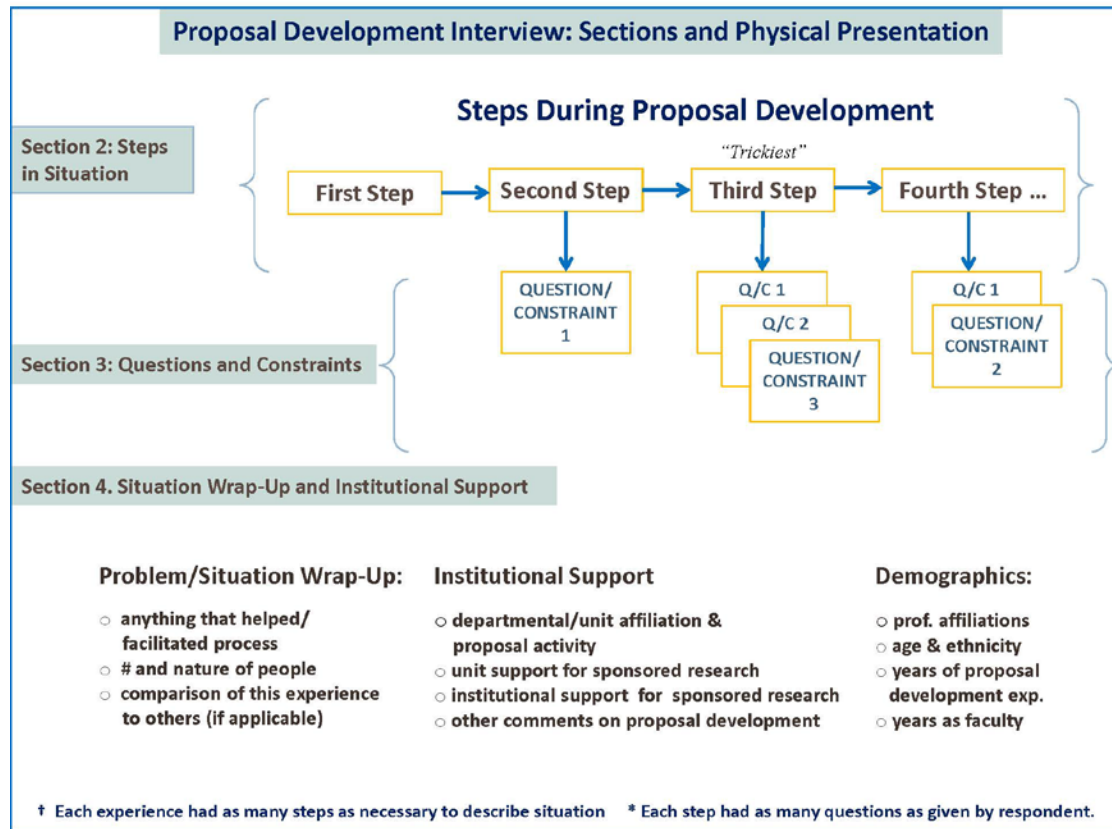
<sup>32</sup> Questions and constraints represented a broadening of the operational definition of Dervin’s “gap” to reflect any condition perceived by respondents as hindering their movement through a situation.

<sup>33</sup> In the case of this study, further probing was conducted during some interviews to investigate characteristics of the questions and constraints, in order to develop a preliminary picture of the user’s information needs and uses. These probes included: if the question were answered; how the question was answered; and the perceived level of importance of the answer to the respondent. However, as these items were not uniformly understood nor applied across all interviews, the results are not reported in this study.

1. Introduction – The interviewer and research topic were introduced, permission to conduct and record the interview was requested, and verification of a recent proposal development experience was collected, including a brief overview of the chosen proposal;
2. Steps in Situation – The respondents was asked to describe the development of his/her proposal in terms of steps that occurred (decisions, actions, or happenings);
3. Questions and Constraints – The respondent was asked to review his/her sequence of steps and identify the trickiest or more difficult point; then to list the questions or constraints he/she experienced surrounding this point, from the most pressing to the least. At the end of question/constraint identification, the respondent was also asked to provide things that helped or facilitated the development of his/her proposal.
4. Situational Wrap-Up and Institutional Support – The respondent was asked to list the length of the situation in months, the number of faculty/senior researchers involved, and the number and nature of support staff, and to comment on the nature of this proposal development experience in relation to others he/she had had (if applicable). The respondent was also asked about his/her perception of the culture of support for sponsored research in the primary institutional unit and for the institution as a whole. The respondent was also asked if he/she were influenced by any extra-institutional forces in regards to proposal development and to provide any other comments

regarding the proposal development experiences (for this situation or in general) that he/she saw as relevant.<sup>34</sup>

The major sections of the interview are displayed below in Figure 3.1.



**Figure 3.1: Interview Sections and Physical Presentation**

The introduction section of the interview set the stage for the nature and purpose of the investigation. The introduction was intentionally formal, as a sign of respect for the participants. The researcher's academic and profession affiliations to the institution under study were frankly noted. Though raising the researcher's professional position as a

<sup>34</sup> Observations regarding perceptions of institutional support for sponsored research were descriptive and informative, and thus have been reported and discussed in Chapter 5 as part of recommendations for additional research. Responses regarding things that helped or facilitate during proposal development (section 3), as well as those regarding extra-institutional forces for sponsored research (section 4), were determined to be not well enough reported respondents or supported by the design of this study to report in the formal results.

research administrator may actually heighten anxiety of participants –perhaps inducing a halo or Hawthorne effect (Leedy & Ormrod, 2005) – the researcher viewed it as unethical to approach the administration of the interview protocol in any other way. However, to offset the disclosure of multiple affiliations, the invitation to participate in the interviews (see Appendix A) included an indication of the disassociation of the research with the academic office of employment, and instead emphasized the researcher’s status as a graduate student. This emphasis was reiterated during the interview process.<sup>35</sup>

The introduction to the interview was formulated in this manner to establish the authority of the researcher (to gain the comfort and cooperation of the respondent) and also to demonstrate honesty with regard to the researcher’s related institutional role. At the same time, an effort was made to establish a certain detachment from that role – as an administrative staff member of the institution under study – and to indicate impartiality to the disciplinary home of the respondent. If the interview protocol were to be employed outside of the researcher’s institution of employment, then a simple statement of professional affiliation would likely suffice.

The second section of the interview regarding the steps in situation was designed to effectively elicit a recent memory from the respondent through deliberate reflective commentary. This was facilitated by requesting a general description of the proposal development experience from the respondent, then by asking the respondent to break that experience down into a step-by-step description.

*Let’s look at this in some more detail. Please recall for me the main steps that occurred during the development of your proposal. A step can be something you*

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<sup>35</sup> The invitation for participation also included two mentions regarding the potential benefits of the research to help cement the purpose of the research and to instigate participation.



*decided, an action you took, something someone else did, or something that just happened. As you tell me about each step, I'm going to make notes on these cards – one for each step.*

All responses for the first interview item (steps) were collected on 3x5 cards and placed horizontally on a flat surface in front of the respondent, with a corresponding step number recorded on the card to indicate step order as given by the respondent. The interviewer recorded each step on a single index card. All steps were recorded on the same color of card.

Once the steps were identified, they were repeated back for clarity and any necessary corrections or adjustments in the time line of the steps were made. Once all steps were recorded, the interviewer reviewed the group of cards with the respondent to make sure no steps were missing and that the steps accurately reflected the process and its temporal order. This recording method allowed for review and confirmation by the respondent, as well for visual organization of the data, both during the interview for the respondent, and after the interview for the purpose of data analysis.

The third section of the interview elicited questions and constraints associated with the steps of the experience. After the respondent provided the sequence of steps, he or she was asked to identify the trickiest or most difficult part of the process:

*Ok, now that we have a representation of the proposal creation, can you identify for me the first point that was really tricky or difficult out of these steps? ... For example, maybe you weren't sure what to do next, or you weren't certain where to find answers or who to talk to. The point where things didn't go well, where you had a difficult question or a preponderance of questions, or where you felt*

*constrained in some way – something that caused you to pause, or just when the development of the proposal stopped.*

The purpose of identifying the trickiest (most critical) point in the process was to help respondents focus on a point in their experience during which they experience uncertainties (gaps in their understanding). Having respondents focus on and recall one memorable point in the process, the likelihood of eliciting specific questions surrounding this point was increased. Once the “trickiest” point was identified, respondents were asked to speak about questions or constraints they experienced during and surrounding this step, in order to represent the gaps the respondent perceived at that point in the experience.

*Ok, so for this step right here that represents a difficult point, I want you to take another moment and think back about what questions or constraints you faced in relation to this step. The questions don't have to be something that you asked out loud –they could just be questions in your head in relation to this particular step during the development of your proposal, or constraints meaning something that was holding you back or preventing you from moving forward in the proposal development process ...*

Each question or constraint was recorded on a different 3x5 card, which was then placed vertically in the order given beneath the step to which it applied. This physical organization of interview responses is displayed in Figure 3.1 above. As with the steps, once the respondent's questions/constraints were recorded, the interviewer reviewed them with the respondent to ensure accuracy and coverage. This process was repeated for the

steps immediately before and after the step identified as the “trickiest.” As time allowed, the interviewer also captured the second most difficult point (and the steps before and after) and the questions and constraints in relation to those steps. The resultant sequence of cards created a matrix, as illustrated in Figure 3.1, where the steps were laid out in a horizontal row, while the questions and constraints became columns under the steps to which they related.

The fourth and last portion of the interview was a section for situational wrap-up and institutional support. This section included three subsections of items regarding more generalized information, including items about the problem/situation as a whole, items regarding nature of the respondent’s institutional unit, general comments on proposal development, and demographic items. Some of these items, including items regarding the nature of support staff involved in the process and comparisons between this experience and other proposal development situations, were not uniformly interpreted or responded to by respondents, and thus were not reported in this study. Results from all other items are summarized in Chapter Four. The next section of Chapter Three discusses pre-testing of the interview protocol and changes made to interview protocol as a result of pre-testing.

## **Pre-Testing and Incorporation of Constraints**

### *Pre-testing*

Interview items were subjected to multiple pre-tests in order to determine if they were understandable for respondents and if they were in fact eliciting information behaviors surrounding proposal development. Pre-testing led to a few changes in the items of the protocol. First, a few items were rephrased based on respondent confusion.

Such rephrasing included the addition of a clause to help with respondent identification of the step or steps that were the most “tricky or difficult.” Using a new statement, based on the cognitive movement metaphor (Dervin, 1983; Nilan et al., 2004; Nilan & Mundkur, 2007), respondents were asked to describe: “The point where things didn’t go well, where you had a difficult question or a preponderance of questions, or just when the development of the proposal stopped.”

### *Questions vs. Constraints*

One major change to the interview protocol was in the form of the collection of “questions and constraints” from the respondents (the operationalization of gaps), as opposed to the original protocol design to collect questions only. This change in the operational definition of “gap” was in response to the difficulties respondents sometime had during pre-testing in noting what their questions were during the tricky or difficult parts of their proposal development experience. After clarification, some respondents could note “something that caused you to pause” in statement form rather than question form. Based on these results, the protocol was rephrased to allow participants to list “questions or constraints” for the trickiest points in their process.

*Ok, so for this step right here that represents a difficult point, I want you to take another moment and think back about what **questions or constraints** you faced in relation to this step. The questions don’t have to be something that you asked out loud – they could just be questions in your head in relation to this particular step during the development of your proposal, or constraints meaning something that was holding you back or preventing you from moving forward in the proposal development process ...*

After this adjustment in the interview protocol, respondents in subsequent interviews experienced no difficulties in identifying their “gaps” in understanding during their proposal development experiences. Examples of responses to this item are provided later in Chapter Four.

### *Significance of Constraints*

The addition of constraints to questions fit the cognitive focus of the protocol, and provided a potential enhancement to the profiling of proposal development as a problem. For the purpose of this study, constraints were defined as “any condition perceived by users that either facilitates or hinders movement (i.e., step-taking)” and were noted as being derived in part from Dervin’s conceptualization of information use (Nilan & D’Eredita, 2008). Conceptually, constraints can also be interpreted as potentially enduring barriers as opposed to simplistic questions which may be resolved during a given step. One type of constraint might be physical – as in a physical barrier which prevented movement of a user through his/her problem/situation. Another type of constraint can be conceptually presented as a gap via Carter’s (1980) notion of stop in cognitive movement, when a user has to ‘stop’ to figure out what’s going on before he can move forward. In this manner, both questions and constraints were employed for this study as the operationalization of a user’s gap in understanding during the problem/situation.

The next section discusses another deliberate set of choices in the design of this study – sample selection.

## **Sample selection**

Sampling is the process of selecting units (e.g., people, organizations) from a population of interest. Information behaviors surrounding the process of proposal development were investigated for this study using data collected from a sampling frame of proposal-active faculty at a single research-intensive institution of higher education. The sample for this study included 27 faculty members from 11 graduate social science and professional programs at four schools and colleges (out of 11 disciplinary-based schools and colleges) within the university. The primary purpose of the sampling strategy was to generate variance – to collect as many different descriptions of proposal development experiences as possible. Emphasis was placed on incorporating a variety of situations to avoid bias in the sample while attempting to get the broadest range of behaviors associated with proposal development. Additionally, this variance was desired to produce a broad variety of questions experienced by respondents during their situations. By identifying patterns (similarities) across such a wide variety of experiences, the strength and applicability of this research approach was demonstrated.

For this study, a combination of purposeful and snowball sampling methods was employed to identify and recruit a broad-based sample.

### *Purposeful sampling*

Participant selection began by a review of institutional proposal submission records to determine eligible faculty (as primary investigators) from the institution. For this investigation, faculty members who submitted a proposal in the 18 months prior to the study were selected through purposeful sampling during the initial rounds of interviewing. Purposeful sampling includes the selection of participants with the intent of

capturing a particular individual or members of a group (Leedy & Ormrod, 2005).

Though a recognized threat to validity, purposeful sampling was conducted to ensure coverage of numerous types of experiences. This sampling strategy specifically enabled the limitation of the sample to tenure and tenure-track faculty who had recently been engaged in proposal development activities, in order to enhance respondent recall of events. In addition to a recent track record of proposal activity, potential participants were selected based on a collection of demographic characteristics, including: discipline, departments (similar to discipline, but not always), schools or colleges, tenure-status, gender, funder type, proposal type, and level of experience with proposal submission and/or award receipt.

Purposeful sampling in this manner was conducted to provide a general balance across situational characteristics. Of the faculty identified as eligible, those with whom the investigator had previous contact (via e-mail, phone, or face-to-face) were first selected to receive e-mail invitations to participate in the study in order to increase the likelihood of receiving an immediate positive response and build a basis from which to begin snowball sampling.

### *Snowball sampling*

Snowball sampling is the use of initial participants for referrals to additional participants. This method was used by asking for referrals from initial participants in the study to expand outside of the researcher's academic and practitioner disciplines. After each interview, referrals were requested from participants (as well as from faculty who were invited to participate in the first round of interviews and were interested, but declined) to other faculty within the institution. The names of faculty referred in this

manner were then checked against the institutional records of proposal submission for eligibility. Those determined as eligible received invitations to participate in the study, and referring faculty were noted in the invitation. Invitations for participation in interviews were issued in small rounds (3-5 at a time) to enable detailed record-keeping and tracking of potential participant characteristics. As interviews were completed, additional small rounds of invitations were sent, with care taken to include a variety of proposal and faculty types, and with updates made to the sample pool as university records regarding proposal submissions were updated.

### *Variance*

As previously mentioned, a concerted effort was paid to producing variance in situations through sample selection. Variance in perspectives of the problem/situation of proposal development (e.g., a variety in steps and in perceived gaps) was desirable in order represent the “reality” of individual differences as found in an organization such as an institution of higher education, which in turn would provide access to the broadest ranges of behaviors surrounding proposal development in this setting. This variance was initially determined by selecting a wide variety of demographic characteristics to be represented in the sample, including tenure status, gender, years of experience submitting proposals, primary discipline, primary institutional affiliation when submitting proposals (departmental, center/institute, and school/college), type of funder (governmental or private), and type of proposal (initial submissions and resubmissions). The purpose for such sample selection was not to ensure equal representation to the demographic profile of the institutional population, but instead to provide a wide range of situations from which to develop a dynamic representation of proposal development.



A rough target of twenty (20) interviews was set; however, the target sample size was not the determinant of the extent of data collection. Instead, the interview process ended when it was determined through preliminary analysis that saturation – the point when additional interviews yield little new information – had been reached (Leedy & Ormod, 2005; Schutt, 2006).

### *Saturation and Redundancy*

The goal of this study was to examine for similarities across situations and across respondents. Effort was made to ensure redundancy through deliberate sample selection and theoretical saturation through ongoing review of interview data for repetition in content (in this case, types of steps and questions/constraints). Ongoing review of interview data were conducted after each interview, in order to determine when data collection would halt – as based upon observed redundancy in the description of steps taken in the proposal development process, and questions or constraints experienced in relation to those steps. Such redundancy was evident due to the similar language used by respondents to describe the steps they took to develop their proposal. For example, many respondents reviewed the reviews received on a prior related (but unfunded) proposal as part of their planning for a subsequent submission:

*Step: Reviewed the reviews of the prior submission - and determined to resubmit the proposal.*

*Step: Took a look at the review comments and realized we were probably grandfathered in to be able to revise.*

*Step: Read / reviewed the comments from the previous submission and decided which to respond to (what revisions needed to be made) - redefining the project.*

Many respondents used the same or synonymous words to describe the steps they took and the questions and constraints they perceived, and as such – before formal analysis took place – it was possible for the researcher to recognize redundancy in the steps provided by respondents. Once evidence of redundancy was sufficiently established, data collection was wrapped up, and formal analysis of data began.<sup>36</sup>

In total, 27 in-depth interviews were conducted for this study, resulting in the collection of 419 steps in proposal development experiences, and 173 questions and constraints identified by respondents in relation to those steps. The next section discusses the planning and conduct of the formal analysis of data for this study.

### **3.5 Data Analysis Strategies**

Data for this study were initially analyzed through content analytic procedures, as common for studies framed through the Sense-Making Methodology (for example, see Dervin & Dewdney, 1986; Nilan & Fletcher, 1987; Dervin et al., 2006; Souto et al., 2008). A detailed data matrix was developed to organize interview data for analysis. Additionally, the 3x5 cards of respondent's steps were physically manipulated for inductive content analysis of step sequences and step types (Nilan & Fletcher, 1987). Codes were developed for responses to interview items, as well as to code data collected regarding static characteristics surrounding respondent proposal development experiences – such as type of funder approached, type of proposal submitted, primary discipline and home school or college of respondent – as gathered from the demographic section of the interview or from institutional records.

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<sup>36</sup> Redundancy was established through preliminary review of interview results between the 23<sup>rd</sup> and 24<sup>th</sup> interview, however, four additional acceptances for interviews were received at or around the same period (from the outstanding invitations issued) so these interviews were scheduled and conducted.

Additional data were collected through open-ended interview questions which were subjected to qualitative analysis to identify themes across responses. The next sections of Chapter Three discusses in detail the data analysis procedures for this study, including the rigorous development of a content analytic scheme for the types of steps taken by respondents during their proposal development experiences – the result of which was used to create a dynamic and iterative model of faculty cognitive behaviors during proposal development as the major contribution of this study.

### **Units of Analysis**

For this investigation, the unit of observation consisted of faculty from four schools and colleges within a single institution. The units of analysis were: 1) the problem/situation under investigation; 2) the perceived steps of taken during that problem; and 3) the perceived gaps associated with those steps. In many studies guided by the Sense-Making Methodology, the sense-making instance as a whole has served as the unit of analysis. Dervin has said such a framing allows the respondent to create his/her own context and to be different in different contexts (Dervin, 1983, p. 20). For this study, this framing allowed participants to contextualize their most recent proposal development experience in terms of *that experience*, rather than forcing them to generalize across multiple experiences with different contexts, thus affecting the richness and validity of the data by creating a halo effect, whereby respondents respond to researcher queries with what they think the researcher wants or expects to hear or with what they think will make them look good. In addition, the multi-unit design used for this study reflects a consideration of macro and micro units of analysis, which have been

noted as necessary to investigate the granularity of problem elements, such as multiple gaps in relation to one cognitive step (Nilan & D'Eredita, 2008).

## **Content Analysis**

Data were organized and the primary model-building analysis for this study was conducted via standard inductive content analytic procedures. Content analysis is a method employed to translate open-ended responses into a form that is more easily analyzed through quantitative or qualitative analytic procedures and into one that can be incorporated with close-ended situational and/or demographic characteristics. Multiple current texts are devoted to this approach (for example Krippendorff, 2004 and Neuendorf, 2002), as content analysis specifically enables the recording and analysis of both manifest and latent (underlying) content (Neuendorf, 2002; Case, 2007).

Content analysis is formally defined as “a research technique for making replicable and valid inferences from texts ... in the context of their use” (Krippendorff, 2004, p. 18)<sup>37</sup> and “the systematic, objective quantitative analysis of message characteristics” (Neuendorf, 2002, p. 1). Per Neuendorf, during content analysis the researcher first identifies a sample of the data to be studied, e.g., the unit(s) of analysis, which for this study were problem/situation, step, and question/constraint. Next, the researcher defines the characteristics or qualities they wish to examine in these data. The requirements for content analytic variables are that: 1) the individual values of a variable must be mutually exclusive relative to each other (i.e., it is not possible to code a unit of data into two categories of a variable at the same time); and 2) the joint values of a

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<sup>37</sup> Note that in this instance “texts” is used to imply both pre-printed materials (e.g., existing documents such as a letter or memo) as well as verbal material recorded and analyzed for the purpose of the research conducted. In this manner, “texts” can be interpreted as the “message” being conveyed through some form and analyzed by the researcher.

variable must provide an exhaustive account of all elements of that variable (i.e., cover all data distinctions) (Krippendorff, 2004, p. 155).

## **Codebook and Data Matrix**

For the purposes of content analysis, a codebook is developed prior to data entry; however, the codebook may be frequently revised and updated during the process of analysis to allow for the addition of new codes, adjustment to existing codes, or subsuming of codes. A codebook can be understood as a dictionary of formatted data – a source for metadata (information about data) (Newton & Rudestam, 1999, p. 1). The codebook describes the study (name of study and date[s] of data collection), codes assigned, variable definitions, names, ranges, and codes for missing variables. The codebook acts as a “map” between the interview protocol and the data matrix, which represents the most compressed form of data as gathered from the study.

A codebook helps to record and organize cases, anomalies or patterns a researcher may find (Newton & Rudestam, 1999), and it also enhances the reliability of the research results by ensuring that a repetition of the study could be carried out completely by another researcher with the aid of the codebook. A codebook can actually be seen as a quantitative tool, lending analytic authority to a qualitative study when a more systematic approach is desired (Creswell, 2009, p. 188). Use of the codebook in this manner supports one of Dervin’s primary assumptions for the Sense-Making Methodology – that “Sense-Making has been designed to incorporate qualitative emphases and sensitivity with quantitative systematization” (Dervin , 1999, ¶24).

The codebook developed for this study contained multiple examples of record keys (short coding keys representing simplistic coding schemes) along with more fully

developed content analytic schemes for coding. A portion of the codebook developed for this proposal, with multiple examples of record keys, is shown below in Figure 3.2, and the process for the development of a content analytic scheme for type of step will be described in the next section.

### **Content Analytic Scheme Development**

Coding is the process of converting data into a format that can be systematically compiled. After the completion of data collection through interviewing, a content analytic scheme for coding step data was inductively developed. The content analytic scheme developed for coding steps taken during proposal development involved a physical process of arranging step cards (containing descriptions of the steps taken during proposal development, as stated and verified by the respondents) in columns and rows after reviewing the step descriptions. The columns represented similar steps taken by different respondents during proposal development and the rows represented the situations (individual interviews). The cards (steps) within the rows (situations) remained in the sequence specific by respondents during interviews (i.e., articulation order), while the columns were created by horizontally shifting individual steps within the rows to align with similar steps from other rows.

CLDeitz Proposal Development Study Data Entry Codebook (Date: Feb 25, 2011)				
Excel Column	Variable Name	Description	Code and Responses	Source
A	INTRV_ID	Unique numerical identifier (record key)	1-2 digit number 1 through 27	Interviewer
B	INSTP_ID	Unique numerical identifier (record key)	7 digit numeric identifier: <b>1 digit</b> = Interv.phase 1-3 (ph1-pretest, ph2-test, ph3-secondary test); <b>2-3 digits</b> = Interview # w/in phase; <b>4-5 digits</b> = step #; <b>6 digit</b> = N/A-0 (no qc), question-1 Constraint-2; <b>7 digits</b> = quest/const #. Example: 2080327 stands for "Phase 2, interview 8, step 3,	Interviewer
C	LOCATION	Numerical description of general interview location (record key)	0=Interviewer office 1=Respondent's office 2=Conference room 3=Eatery - campus 4=Eatery - off campus 5=Library	Section 0.1
D	DATE	Date of interview	mm/dd/yy	Section 0.1
E	GENDER	Code for respondent's gender	0=Female 1=Male	Interviewer
F	DURATION	Duration of interview	Hours and minutes in 24 hr clock time ex. 1:30	Section 0.1
G	ETHNICITY	Code for ethnicity (record key)	0 = African American 1 = Asian 2 = Causasian 3 = Native American 4 = Hispanic/Latino 5 = Multi-racial	Section 4.1
H	AGE	Code for age group (record key)	0 = 20-30 years old 1 = 31-40 years old 2 = 41-50 years old 3 = 51-60 4 = 61-70 5 = 71 or over	Section 4.2
I	TENURE	Code for type of appointment (record key)	0=Assistant Professor; 1=Associate Professor; 2=Professor	<a href="http://www.syr.edu">www.syr.edu</a>
J	YRS_POS	Number of years in comparable position	1-n	Section 4.3
K	YRS_EXP	Number of years experience submitting proposals	1-n	Section 4.4
L	AFFILIATION	Code for strongest institutional affiliation by unit (record key)	0=Individual; 1=Departmental; 2=Center/Institute; 3=School/College; 4=University; 5=Other	Section 3.2.1

**Figure 3.2: Examples of Codebook Record Keys**

Four rounds of step reflection and organization occurred during the creation of the content analytic scheme (CA Scheme) for step type. Round One employed a sub-sample of situations to establish the temporal order of steps within situations, and to create of the first columns of cards representing step type, by visually analyzing the contents of cards

for patterns between situations. Round Two employed an additional sub-sample of situations to continue the development of columns of step type, including the first attempt to consolidate steps into groups of similar types of steps. Round Three was used to organize a new sub-sample of situations in columns of step type, to divide situations by seniority to visually test for differences between distinct groups of faculty. This round also served as the basis for the preliminary content analytic scheme for type of step. Round Four was conducted with the same selection of situations as Round Three, which were then used to “test” the preliminary CA scheme. These rounds of visual card organization are described in further detail below.

#### *Round One in CA Scheme Development*

Round One consisted of establishing the temporal order of situations – by comparing the cards from a random sample of situations – and the creation of the first columns of cards representing step type. The first round of step reflection and organization consisted of physically laying out the step cards from a sub-sample of ten randomly selected interviews. Step cards were 3x5 index cards inscribed with the description of steps as given and verified by respondents. Cards were spread on the floor of an open, low-traffic room. This area was subsequently blocked off to facilitate the organization of cards (and related content analytic scheme development) over a period of time. Step cards (grouped by situation) were placed horizontally in step order, as determined by respondent articulation order and verification during the interview process. Each situation was placed vertically, one on top of the other, to form a loose grid-like pattern, with situations represented by rows, and steps organized in columns. Initially,



columns were created simply based on the number of steps in a situation (i.e., a situation with 20 steps occupied 20 rows, while a situation with 15 steps occupied 15 rows).

Once laid out in this manner, the texts of the steps cards were reviewed and cards were shifted to columns on the left or right (maintaining respondent articulation order) to stack similar steps between situations vertically. The columns then began to represent similar steps taken by different respondents during proposal development. Similarities between steps were determined by identifying common words used by the respondents to describe steps and/or synonyms or similar phrases. For example, “I wrote a draft ...” was placed in the same column with “Wrote the proposal draft.”

Similarities in language were considered along with their relative time of occurrence during the development of a proposal; activities which seemed similar but occurred at opposite ends of the process were placed in different columns. Organizing steps in this manner gave recognition to the fact that some tasks might be repeated at different times. The step “writing – and rewriting of the proposal...” was noted as a different type of step than “had to rewrite ... the description of the subcontract” based on the location of these steps in the number collection of cards. These steps were placed in columns with similar “rewriting” tasks, but at different ends of the rows, to correspond with the sequence of the steps in their respective situations.

After the first round of card organization, step descriptions were reviewed, and descriptive words from the text which seemed to summarize the activities of the step were circled – especially verbs used by the respondent. For example, steps which included the term “writing” had that term circled (if it represented the main thrust of the activity described).

Once columns of similar tasks were laid out, a title row of additional yellow 3 x 5 cards was created to represent the main activities represented in the steps of that column and placed at the top of the columns. The words on the title cards were assigned by the researcher as abstract representations of the activities on the cards placed vertically under them. These representations became the meta-category titles of the content analytic scheme for types of steps, while the descriptive terms drawn from the respondents' words on the step cards became the specific categories within the main (meta) categories.

### *Round Two in CA Scheme Development*

Round Two employed additional situations to continue the development of columns of step type, including the first attempt to consolidate steps into groups of similar types of steps. In the second round of organization an additional sub-sample of seven randomly selected situations (for a total of seventeen) were organized by columns representing types of steps, now labeled by title cards. After the second round, an outline of the sequence of meta-categories was created from the title cards. This sequence was recorded, reviewed for frequency of step occurrence, and consolidations were made among types of steps that represented similar activities. For example, a column representing "Researching" activities, such as investigating, searching for, and looking up related literature and funding options, was consolidated with the column representing "Reviewing" activities, such as reviewing a request for proposal or other funder materials. Thus, a new column was created for "Researching/Reviewing" which incorporated both types of preliminary proposal development activities. After revisions, the yellow title cards were revised to reflect this new arrangement, and a third round of step-card organization was conducted.

### *Round Three in CA Scheme Development*

Round Three was used to organize a new selection of situations in columns of step type – but with cards divided by seniority to visually test for differences between distinct groups of faculty – and to create the preliminary CA scheme for type of step. For the third round of step card organization, the yellow header cards were placed in the center of the work space rather than at the top. Next, a different random selection of eighteen situations was drawn from the pile of twenty-seven stacks of step cards. This time, junior faculty situations were placed above the title cards, while senior faculty situations were placed below the title cards. This physical organization was conducted to both continue identification and verification of the content analytic scheme for step type (by comparing steps between a different series of situations) as well as to visually analyze steps for similarities and differences between the dichotomous variable of seniority.<sup>38</sup> Another consolidation of columns was conducted at this time and the recorded sequence of steps was revised to reflect the consolidation of meta-categories.

The content analytic scheme for type of step was initially developed after the third round of physical organizing and labeling of the steps. Table 3.3 displays a portion of this content analytic scheme. The scheme contains five columns – Code number, Category (meta-categories and categories), Description, and Examples. Meta-categories (indicated in Table 3.3 by left-justified all-caps category names, with hundreds-level codes – 000, 100, 200) represent the abstractions of steps at a particular point in the process – the terms for which were taken from the yellow title cards for each column of the physical organization of cards. The categories (indicated in Table 3.3 by indented category names

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<sup>38</sup> Interviews were conducted with faculty members with ranks of Assistant Professor, Associate Professor and Full Professor – but were analyzed as either tenure-track or tenured.

and tens-level codes – 010, 020, 030) within the meta categories represent (when possible) the actual terminology employed by the respondents when describing steps and were taken from the terms circled on the cards during rounds two and three of card organization for scheme development. The description provides a short explanation of the code, while the example column includes two or more examples, taken from the interviews, for those codes. A complete description of the content analytic scheme – as

**Table 3.3: Portion of CA Scheme for Type of Step in Proposal Development**

CODE #	CATEGORY	DESCRIPTION	EXAMPLES
000	BEGINNING	Steps beginning the application process, prior to the decision to apply for funding	"E-mailed collaborators in my project to give them a heads up." " There were multiple site visits by the ... program manager (in the April and August before submission) on the existing program. We wanted to show off the new ... center, and we knew we were coming up for renewal."
010	Identifying	Identifying potential topic, need for research or service, new partners, new data or method, or learning of a new funder.	"Getting copied on a chain of e-mails (this is how I came to know about the grant)" "In a meeting on another project, learned of existing dataset in my research area of interest ..." "Got the idea for this project while doing the literature review for another project"
020	Inviting	Being invited to apply or collaborate on project, or inviting someone to collaborate	"Contact from the program officer to solicit myself and colleague via e-mail to tell us to apply for a particular funding program." " I met with my collaborator (past and present) during a conference, and heard his idea of this topic (a survey, for which he already has partial funding for). He invited me to join him and submit a proposal to a different funding agency as the primary investigator." "After a bit (in the fall) I received an e-mail from the program officer asking if I would be willing to be engaged with [the funder] in ... the new funding cycle. This was the start of a more formal relationship."
030	Receiving	Receiving relevant information, such as declination for prior proposal (and related reviews), notice of a funding opportunity, or receiving correspondence that sparks idea	"Got comments back from our first submission; they were so positive that we agreed we wanted to resubmit the proposal." "Received a new article (via e-mail) ... I was intrigued by the idea, so I "clicked" on it and read the entire article, then subsequently searched online and found a huge pool of research in this area." " I received a call for proposals by e-mail - and I was thinking of what I can do to get this grant."
100	DETERMINING	Determining to apply or reapply for funding, alone or as a group, including actions towards a decision	"Contacted dissertation author (whose topic I discovered during that lit review) to use and modify her data collection instruments." "Had the proposal in mind when I came to [this institution] - I can't divorce it from the past."
110	Clarifying	Clarifying proposal information or application process with funder, administration, or others	"Confirmed with the program officer via e-mail that we could submit a second revision" "Contacting the [sponsored research office] to tell them of this opportunity (by e-mail). I received a reply from them that I should contact [the funder] directly about the funding opportunity."
120	Deciding	Deciding whether or not to apply for funding, add a partner for application, on a selected topic or method, or other relevant decisions	"Made a change in the personnel on the proposal based on the reviews. " "Once work published from the first grant, decided to form a second proposal." "Deciding who was going to take the lead on this application, what were going to be the roles, and who was going to be involved. "

the framework for a dynamic model of proposal development – is provided in Chapter Four.

#### *Round Four in CA Scheme Development*

Round Four was conducted with a different random selection of situations, which were used to “test” the preliminary CA Scheme. After initial development of the content analytic scheme for type of step, the scheme was tested on the eighteen situations used in round three. Codes were assigned in the data matrix for each of the steps listed on the step cards and were also recorded on the step cards in red to further enhance visual analysis of the physical organization of steps. As steps were coded, discrepancies were noted between the original placement of the steps in the physical organization of the steps and the code assigned after subsequent review of the step in reference to the content analytic scheme. For a few cases during this round, steps were assigned to new categories within a meta-category. During this round, iterative loops were established between meta-categories. This development enabled the movement of steps back or forth between meta-categories in the scheme, to accommodate for different situations, while still maintaining a general sequence of types of steps in proposal development.

Once the physical reorganization of steps was completed, the content analytic scheme for type of step taken by respondents during the development of proposals was formalized and tested for reliability. This rigorous scheme provided the basis for the creation of a proposal development model of faculty cognitive behaviors – the design of which is discussed later in Chapter Three. In the next section, the process of reliability testing for the content analytic scheme is addressed.

## **Reliability Testing**

Once the content analytic scheme for step type was developed, it was tested for intercoder reliability. A simple reliability coefficient called a percentage agreement index (PAI) was calculated by dividing the number of codes agreed upon by both coders by the total number of codes coded. This formula produces a number between zero (indicating no agreement between coders) and one (indicating complete agreement between the coders). Multiplying this number by 100 provides the reliability coefficient, as a percentage agreement between the two coders. The desired goal of 85% percentage agreement between coders was set. For testing, a random sample of 20% of the total number of steps coded by the researcher was also coded by an independent coder. A reliability coefficient of 87% for the content analytic scheme for type of step was achieved in this manner. This measure of reliability was deemed favorable in light of the granularity of the scheme. The content analytic scheme for step type included 38 categories and 11 meta-categories, for a total of 48 unique categories employed to code 419 instances of steps across problem/situations of proposal development. The content analytic scheme for type of step served as a detailed framework for the creation of a dynamic model of faculty cognitive behaviors during proposal development.

### **3.6 Model Development**

This study was conducted to identify and establish the applicability of a user-based method for investigating information behaviors surrounding the proposal development process. Methods derived from the Sense-Making Methodology (including a modified Micro-Moment Time-Line Interview technique and standard content analytic procedures) were employed to describe the range of information behaviors of faculty

during proposal development. Data from interviews were analyzed to determine if similarities in step taking across situations could be identified. Patterns in the types of steps and in their relative time order of occurrence across a wide variety of proposal development experiences were in fact identified, and these patterns were used to build the content analytic scheme for type of step, as described earlier in Chapter Three. The vibrancy and detail of this scheme – as supported through intercoder testing – led to the creation of a dynamic and iterative model of proposal development. The model itself is presented in Chapter Four, and the potential implications as a tool for enhancing proposal development at institutions of higher education are discussed in Chapter Five.

### **3.7 Chapter Three Summary**

Chapters One and Two put forth the importance of investigating information behaviors surrounding proposal development as a topic in academic and practitioner fields, and the Sense-Making Methodology was described as the primary conceptual framework chosen to investigate such behaviors. Chapter Three introduced the multiple objectives for this study, and detailed the chose methods for investigation. Data for this investigation were collected through in-depth, semi-structured interviews, conducted through a modified Micro-Moment Time-Line Interview approach to carefully elicit faculty members' descriptions of their experiences. A sample frame was constructed based on parameters regarding recent proposal activity, as verified through consultation of publically-available institutional records. Standard content analytic methods were employed to organize and analyze the data, including inductive development of content analytic schemes.

The content analytic scheme for type of step was inductively and painstakingly developed. The process followed for creating the scheme involved physically laying out interview data for organization and visual interpretation. The content analytic scheme for type of step was developed with two primary levels of organization. The abstract level of representation of the proposal development process is represented by 11 meta-categories, labeled with researcher-assigned abstract terms to represent the finer categories clustered within. The finer levels of representation – categories within meta-categories – represent common proposal activities at particular points in the proposal development process, as defined by the terminology given by respondents for these activities (the steps in proposal development).

This semi-hierarchical design represents the strong similarities found across situations for major categories of proposal development activities (or “meta-steps”), while recognizing the variety of additional details perceived by respondents across the variety of situations coded for data analysis. After initial development – through the analysis of multiple sets of randomly selected sets of steps per situation – the content analytic scheme was reapplied to the full collection steps. The content analytic scheme and resultant coding for type of step were supported through intercoder reliability testing, for which a PAI reliability coefficient of 87% was achieved. The strength and vibrancy of this scheme influenced the development of a dynamic model of proposal development.

The data collection and analysis methods for this investigation build upon those described in Nilan and Fletcher’s (1987) study of NSF-funded researchers. Similar to Nilan and Fletcher, a model of the proposal development process was created from the steps collected during in-depth interviews with respondents. This model is presented and



discussed in Chapter Four, and a comparison with the historical Nilan and Fletcher (1987) model for similarities and differences is conducted in Chapter Five. The model of faculty cognitive behaviors during proposal development is extended by a discussion of the nature of questions and constraints surrounding the problem/situation of proposal development, as situated at different points in the process.

The goals for this study included contributing to practitioner and academic fields alike: first, by building on existing information behaviors studies through the application of a user-based investigation in an academic administrative environment; and second, by instigating practitioner discussions in research administration for further user-based investigation and design of dynamic and flexible proposal development services in higher education. In the next chapter, the results of this study are presented as evidence towards the achievement of the first goal, while Chapter Five is used to set the stage for the achievement of the second goal.

## CHAPTER FOUR: Results of Study

### 4.1 Introduction

Chapters One and Two of this thesis discussed the potential for and appropriateness of a user-based study of information behaviors surrounding proposal development – as guided by the Sense-Making Methodology, and building on Nilan and Fletcher’s (1987) study of NSF-funded researchers. This style of investigation was identified as a potential means for informing the traditionally compliance-driven activities of research administration community in institutions of higher education (IHEs). As such, this study also provides a novel practice-focused application of information behaviors research for the field of information studies.<sup>39</sup>

This study was guided by the following research question: *How can a user-based investigation be employed to define and describe information behaviors during proposal development?* Chapter Three provided a detailed account of the methods chosen and subsequent design of this study in response to this research question. Chapter Four continues to address this question by providing the notable findings from this study. By conducting a holistic examination of the proposal development experience, through the eyes and words of users, this study contributes to the fields of information studies and research administration by providing a bottom-up (user-based) interpretation of the process, rather than a top-down (traditional, or observer-based) assessment of the process as an expert. The very act of collecting and analyzing the data in this manner provided a

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<sup>39</sup> Though the Nilan and Fletcher study (1987) applied a user-based investigation of information behaviors to proposal development, the direct intention was not to inform the field of research administration.

new perspective of the process to the researcher – a perspective which the researcher hopes will also inform the field of research administration.

Methods for this study were drawn and adapted from the Sense-Making Methodology (SMM) to operationalize this user-based epistemological position and investigate information behaviors surrounding proposal development. The methods chosen for this study were in-depth semi-structured interviews with purposely sampled respondents (selected for maximum variance of experiences in proposal development), data from which were primarily analyzed through content analytics procedures.

## **Sample**

The sample for this study included twenty-seven 27 faculty members, drawn from 11 graduate social science and professional programs of four schools and colleges at one research-intensive institution of higher-education. For this study, 44 total invitations for participation in interviews were issued, 28 of which were accepted, and 27 of which were completed. Table 4.1 shows the general balance and breadth of demographic and situational characteristics as achieved through purposeful sampling.

Of the 27 respondents, there was an almost equal representation of males and females (14 and 13), a fair balance of junior and senior faculty (16 and 11), a similar balance of proposals to federal and non-federal funders (16 and 11), and a relative balance in the number of new proposal submissions versus some type of resubmission<sup>40</sup> for funding (11 and 16). One demographic variable which was imbalanced for this study was race – the majority of interviews (19) were conducted with Caucasian respondents.

Years of experience between respondents ranged from none (for two respondents

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<sup>40</sup> Resubmissions included: resubmissions of a revised proposal to the same program; resubmission of a revised proposal to a different program; and competitive renewal applications.

submitting their first-ever proposal) to one respondent with 40 years of experience; the average years of experience was 12, and the median was eight years of experience in proposal development and submission. The months of development for proposal submissions ranged from less than one (for one proposal which was developed in three weeks), to three proposals which took over 18 months to develop. The average length of proposal development situation was three months, while the median was two months.

**Table 4.1: Sample Description**

# of Respondents	Male/ Female	# of Depts	Junior/ Senior Faculty	Avg Yrs Exp	Fed/ Priv \$	Avg # of Faculty	Avg # Months	New / Resubmission	Ethnicity
27	14/13	11	16/11*	12	16/11	3**	3***	11/16	African American - 2 Asian - 4 Caucasian - 19 Other - 2

\*Assistant Professors 16; Associate Professors 4; Professors 7

\*\*With a concentration of 56% of experiences between 1-2 faculty per situation.

\*\*\*With a concentration of 85% of experiences between 1-12 months per situation.

## 4.2 Methods for Analysis

Three units of analysis were employed for this study, each representing a finer level of scrutiny: the problem/situation (the proposal development experience), the steps (cognitive or cognitive and physical activities) which made up that experience for the respondent, and the gaps (questions and constraints the respondents perceived during that experience). Steps gathered from a series of interviews were compared visually, a technique made possible through the physical collection of steps as noted on 3x5 cards during interviews; which were then reviewed and validated by respondents. A comparison of steps across situations was completed to identify similarities (patterns of steps) among user experiences.

As discussed in Chapter Three and earlier in Chapter Four, the sample for this study was purposefully selected to incorporate a wide variety of individual characteristics in order to achieve variance in the types of proposal development experiences examined, and therefore in the breadth of steps and related questions and constraints represented. However, analysis of the data did not focus on these individual characteristics as previous studies guided by Sense-Making have shown that such across time-space predictors are significantly less efficient in predicting information behaviors than time-space specific predictors like steps and gaps (Dervin, Nilan & Jacobson, 1982; Newby, Nilan & Duvall, 1991). Instead, data from this study were examined for patterns (similarities) across the variety of proposal development situations. The purpose of such pattern identification is to enable insight into the specific information behaviors of faculty, knowledge that can then be employed to design, organize and/or facilitate responsive information services and resources; to provide users what they need, when they need it during the development of a proposal.

Patterns were identified through the visual comparison and organization of sub-samples of steps, which in turn led to the development of a robust content analytic scheme for types of steps (cognitive or cognitive and physical) taken by faculty during situations of proposal development. This scheme was fine-tuned by applying it to additional sub-samples of steps. The adjusted scheme was then used to code the entire collection of steps from the study, and then tested for inter-coder reliability. A reliability coefficient (PAI) of 87% was achieved. This scheme was then employed as the framework for the creation of a proposal development model of faculty cognitive behaviors, which are now presented and discussed.

### **4.3 The Problem/Situation: A Model of Proposal Development**

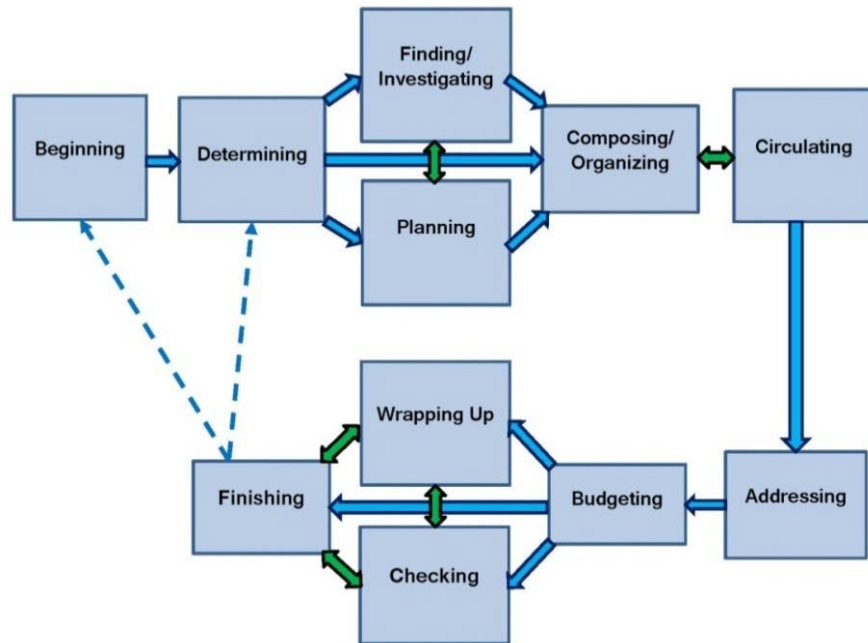
As noted in Chapter One, there are numerous potential combinations of situational characteristics attributable to any given proposal development experience. Each situation is unique to the individuals involved – and yet in order to provide support to large bodies of faculty, research administrators must make generalizations about situations. Currently, such generalizations are primarily based upon institutional and federally regulated requirements for proposal submissions and grants administration. While this compliance-based framework cannot be ignored, this study argues that it can be enhanced with recognition of information behaviors surrounding proposal development, as gathered through a user-based study guided by Sense-Making methods.

While the variety of characteristics attributable to individual proposal development experiences is enormous, patterns between experiences can be recognized by identifying common steps taken during the process in relation the time and space of that step taking. The process for the collection of steps in this study – through in-depth interviews with 27 respondents at one institution of higher education (IHE) – was described in Chapter Three. The next section presents the model developed from analyzing these steps – specifically by identifying commonalities or patterns across the steps of the situations, while maintaining the temporal order provided by the respondents. Additionally, the patterns and range of questions and constraints perceived by respondents in relation to these steps are examined by their points of occurrence on the model.

## **The Proposal Development Model**

The proposal development model of faculty cognitive behaviors, presented below in Figure 4.1, represents the primary contribution of this study as a user-based empirical investigation of information behaviors surrounding proposal development in institutions of higher education. Figure 4.1 presents a visual representation of the process, created from the rigorous content analytic scheme based on patterns of steps taken by faculty during the development of a proposal.

The labels of the boxes in the model represent the abstracted meta-categories of activities of the process: Beginning, Determining, Finding/Investigating, Planning, Composing/Organizing, Circulating, Addressing, Budgeting, Wrapping Up, Checking, and Finishing. The arrows between meta-categories represent the primarily sequential directionality of the model, with two-way arrows indicating the allowance of iteration between select meta-categories, and dotted arrows between Finishing and Beginning or Determining representing the common cycling from one proposal development situation to the next. A unique value of this model, in its representation of the proposal development process, rests in two key features: the reflection of user language for activities in the process; and the flexibility for movement between particular points in the process.



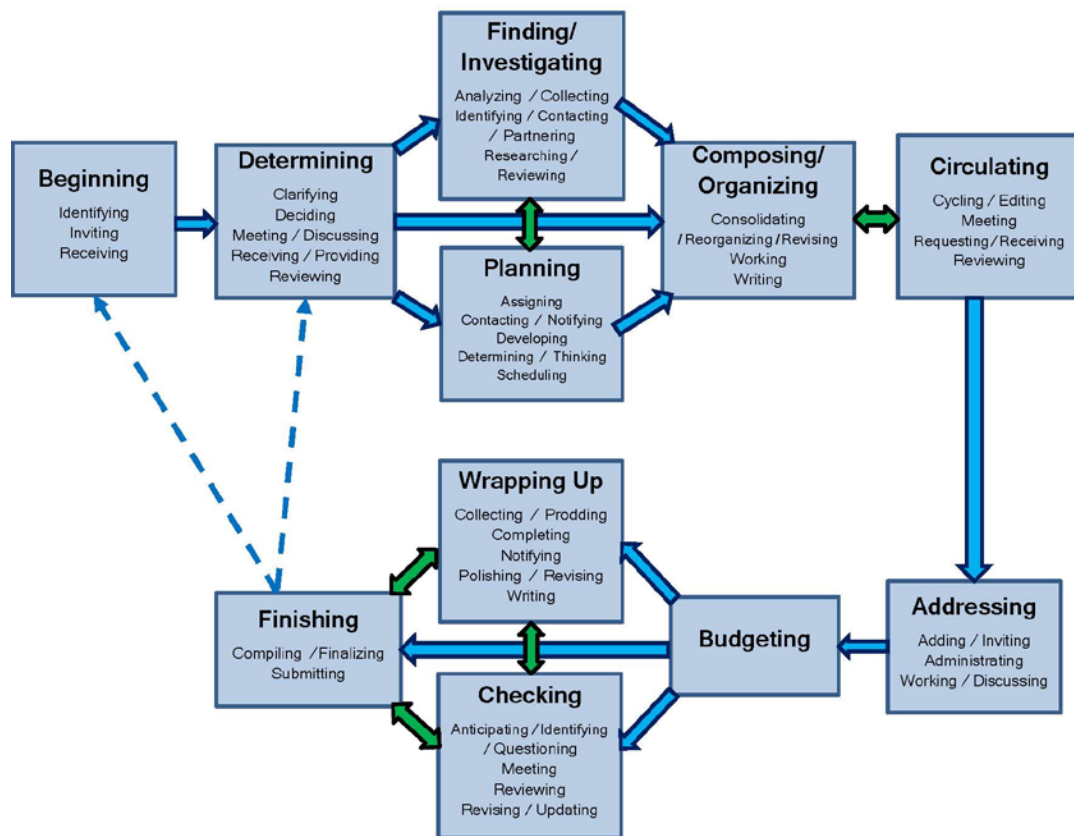
**Figure 4.1: Proposal Development Model of Faculty Cognitive Behaviors**

The meta-categories of this model represent clusters of steps (common activities) in the process. More specific categories are included within the meta-categories to further identify the properties of these clusters of steps. As discussed in Chapters One and Two, steps are the operationalization of “cognitive movements” (Nilan et al., 2004; Nilan & D’Eredita, 2008). The categorization of steps was derived from patterns identified in responses across respondents regarding their recent proposal development experiences. These categories within meta-categories are displayed in Figure 4.2. The description in Chapter Three of the content analytic scheme used to develop this model notes that labels for categories are taken directly from respondents’ descriptions of steps. Employing user language for categories of the model enables users to easily identify with these terms in future applications of the model, such as a basis for systems development.

For any given problem/situation of proposal development, the collection of steps taken as a user moves through the process may include any number of the meta-



categories in the model. Meta-categories may also be skipped or repeated, but still follow the general sequential order of the process as presented in Figures 4.1 and 4.2, and indicated by the one-way arrows between many meta-categories. For the categories (common activities) within meta-categories, however, there is no sequential order established, and any combination or order of categories within a meta-category may be employed. Budgeting is the only meta-category without more specific categories, as shown in Figure 4.2. Budgeting serves as both category and meta-category, and as such may be repeated any number of times.



**Figure 4.2: Proposal Development Model – Categories within Meta-Categories**

Like the terminology applied for categories of common activities, the sequential order of the model is also taken from the analysis of 27 different respondent situations of

proposal development, across a wide variance of experiences – as discussed in Chapter Three. This natural order of activities engenders additional respondent identification with the model, as it exemplifies both the language and patterns of user activities. This model provides a unique, flexible interpretation of the proposal development process, however, through the allowance of iteration between meta-categories. In this model, any meta-category may be skipped or immediately repeated, but movement back and forth between meta-categories was specifically observed in the data and thus incorporated between three areas of the model: between Finding/Investigating and Planning; between Composing/Organizing and Circulating; and between Wrapping Up, Checking and Finishing. These possible iterations are indicated by the two-way arrows in Figure 4.1 and 4.2.

The flexibility of the proposal development model of faculty cognitive behaviors, and its employment of terminology drawn from interviews with respondents from a variety of proposal development situations have been discussed in relation to the value of these factors in enabling users to recognize and orient their processes in relation to the model. The next section describes the individual meta-categories and categories of the model (as common activities in proposal development) and provides examples drawn from study data.

### **Meta-Categories of the Model**

The model presented earlier in Chapter Four, as the primary contribution of this study, is composed of 11 meta-categories. The general descriptions for each of these meta-categories are as follows:

Beginning – Steps beginning the application process, prior to the decision to apply for funding;

Determining – Determining to apply or reapply for funding, alone or as a group, including related actions towards a decision;

Finding/Investigating – Preliminary research for data, literature, funding options, potential partners, research sites, etc.;

Planning – Planning for project or proposal, alone or as a group, including planning for budget and other related components;

Composing/Organizing – Composing & organizing proposal components or ideas, including rewriting/reorganizing of prior related materials;

Circulating – Circulating of proposal versions or components between partners or research administrators for review (including multiple rounds or cycles); includes virtual and physical circulation of ideas and participants through meetings, presentation and discussions;

Addressing – Administering proposal development tasks OR Addressing needs, roles, weaknesses or administrative hurdles identified during proposal development/project planning, including dealing with problems and time constraints;

Budgeting – Preliminary or primary budgeting for proposal, including re-budgeting of prior related proposals;

Wrapping Up – Wrapping up of proposal development tasks, including completing collecting, notifying, polishing, prodding, writing;

Checking – Reviewing and revising proposal (including formatting), including anticipating difficulties or identifying outstanding items, and meeting to facilitate review;

Finishing – Finishing up - submitting proposal components internally or full proposal externally, compiling components and paperwork, finalizing of proposal or components, and sending items to research administrators or funder.

Meta-categories were created by conducting numerous reviews of the steps taken by respondents during proposal development, and looking for patterns of steps between situations. Similar steps were grouped into categories of activities (while maintaining the temporal order as given by respondents). These categories were then grouped again into similar types of steps, or meta-categories.<sup>41</sup> The categories of steps were labeled with language drawn from the interviews, while the labels for meta-categories were created by the researcher as an abstract representation of the cluster of the steps within those meta-categories. These meta-categories and their general descriptions are displayed below in Table 4.2. As noted earlier, these meta-categories are abstract representations of major groups of activities within the proposal development process.

Table 4.2 also displays the frequency of steps within meta-categories. Though individual categories within the meta-categories showed greater variance in frequencies of occurrence (which are described later in Chapter Four), the occurrences between meta-categories is fairly balanced across the proposal development process. This is not a reflection of each situation containing steps within each meta-category (e.g., a situation having steps within all 11 meta-categories). In fact, situations contained a wide number

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<sup>41</sup> A detailed description of the physical process of this grouping of steps was presented in Chapter Three.

**Table 4.2: Description and Frequency of Occurrence of Steps Per Meta-Category**

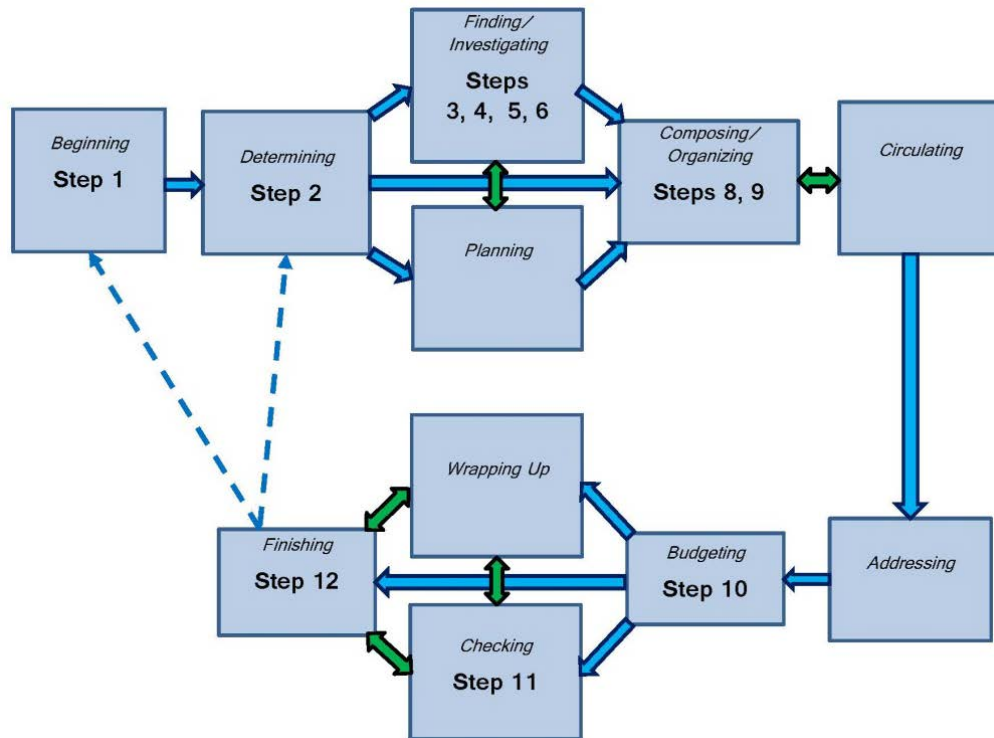
META-CATEGORY	DESCRIPTION	COUNT	FREQUENCY
BEGINNING	Steps beginning the application process, prior to the decision to apply for funding	39	9.30%
DETERMINING	Determining to apply or reapply for funding, alone or as a group, including actions towards a decision	40	9.55%
FINDING/ INVESTIGATING	Preliminary research for data, literature, funding options, potential partners, research sites, etc.	41	9.79%
PLANNING	Planning for project or proposal, alone or as a group, including planning for budget and other related components	37	8.83%
COMPOSING/ ORGANIZING	Composing & organizing proposal components or ideas, including rewriting/reorganizing of prior related materials	45	10.74%
CIRCULATING	Circulating of proposal versions or components between partners or research administrators for review (including multiple rounds or cycles). Includes virtual and physical circulation of ideas and participants through meetings, presentation and discussions	36	8.59%
ADDRESSING	Administrating proposal development tasks OR Addressing needs, roles, weaknesses or administrative hurdles identified during proposal development/ project planning, including dealing with problems and time constraints	28	6.68%
BUDGETING	Preliminary or primary budgeting for proposal, including rebudgeting of prior related proposals	15	3.58%
WRAPPING UP	Wrapping up of proposal development tasks, including completing collecting, notifying, polishing, prodding, writing	42	10.02%
CHECKING	Reviewing and revising proposal (incl. formatting), including anticipating difficulties or identifying outstanding items, and meeting to facilitate review	45	10.74%
FINISHING	Finishing up - submitting proposal components internally or full proposal externally, compiling components and paperwork, finalizing of proposal or components, and sending items to research administrators or funder	43	10.26%
OTHER		8	1.91%
		<b>419</b>	<b>99.99%*</b>

\* Total equals less than 100% due to rounding error.

of steps (from six to 27), and an equally wide variety of occurrences across different meta-categories. Instead, rather than indicating the inclusion a step in each category, the relative balance in the frequency of steps per category is reflective of the strength of each meta-category in representing common occurrences *across* situations. Some situations have more steps towards the beginning, while some situations have more steps towards the end, and yet others have steps scattered throughout the meta-categories of proposal

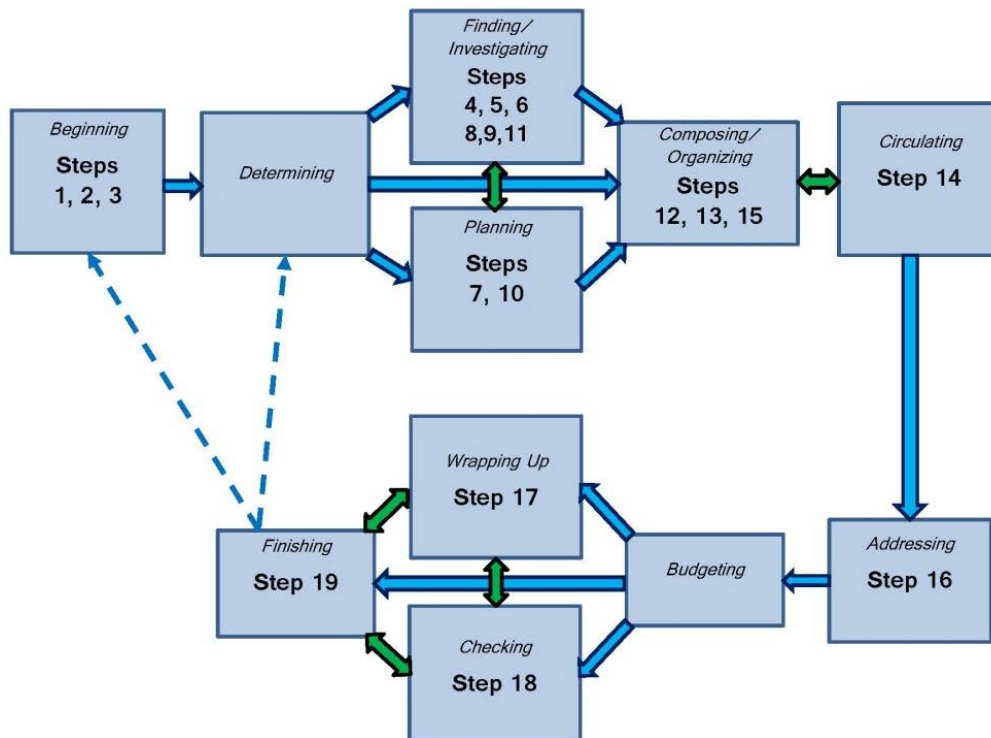
development. In other words, the variation of types of steps across different proposal development situations is well represented by the entire set of meta-categories. This point is further highlighted by the low frequency of steps coded as “other” (eight out of 419 steps) during content analysis – 98.1% of steps were coded within one of the meta-categories. Also, as discussed earlier, additional relevance of the model for a variety of proposal development experiences is provided through the allowance of skipping and repetition of meta-categories, or iteration between meta-categories (see Figures 4.1 and 4.2).

To demonstrate this flexibility of the model, a few specific situations from this study have been mapped onto the model – with steps as provided by respondents placed in their location as coded to the categories and meta-categories of the model. Figure 4.3 and Figure 4.4 present these examples. Figure 4.3 is a representation of steps by meta-category for a new proposal submission from a female junior faculty member to the general program of a private foundation. This example shows the repetition of multiple steps in two categories of the model – during Finding/Investigating and Composing/Organizing. Figure 4.3 also shows how steps can be skipped in the process. For this situation, the 11 total steps were only coded in to seven of the potential 11 meta-categories.



**Figure 4.3: Example of Step Repetition in Situation**

The second example of steps by category, shown in Figure 4.4 below, represents a new proposal submission from a senior faculty member to a request for proposals (RFP) from a federal funder. In this example, eight of the 19 total steps for this situation occurred in multiple rounds between the meta-categories of Finding/Investigating and Planning, while four more steps occurred in iterations between Composing/Organizing and Circulating. This example also contains repetition within meta-categories, as well as the skipping of meta-categories. While Figure 4.3 represents a situation with steps that occurred in sequential order in relation to the steps of the proposal development model, Figure 4.4 presents a pattern of steps with multiple occurrences of iterations between relevant meta-categories.



**Figure 4.4: Example of Step Iteration in Situation**

Figures 4.3 and 4.4 are excellent examples of the flexibility of this model to accommodate a wide variety of proposal development situations. The value of this model lies in the potential to aid the proposal development process by serving as a tool to provide resources to users based on their point in the process, or to co-orient participants in the process (for instance, faculty, research staff, research administrators, even funders). These potential implications of the model are discussed further in Chapter Five. The next sections of Chapter Four describe the categories of specific steps incorporated in each meta-category, as well as provide examples of questions and constraints experienced at different points during proposal development.



## Categories within the Meta-Categories of the Model

Tables 4.3 through 4.12 present the specific categories within meta-categories of the proposal development model, their descriptions, and examples taken from interviews conducted for this study of information behaviors surrounding the proposal development process. These tables also indicate the frequency of occurrences of steps for each category within their meta-category. The development of these categories and meta-

**Table 4.3: Categories within Beginning Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY
<b>BEGINNING n=39</b>	Steps beginning the application process, prior to the decision to apply for funding	"E-mailed collaborators in my project to give them a heads up." "There were multiple site visits by the ... program manager (in the April and August before submission) on the existing program. We wanted to show off the new ... center, and we knew we were coming up for renewal."	8	20.51%
<b>Identifying</b>	Identifying potential topic, need for research or service, new partners, new data or method, or learning of a new funder.	"Getting copied on a chain of e-mails (this is how I came to know about the grant)" "In a meeting on another project, learned of existing dataset in my research area of interest ..." "Got the idea for this project while doing the literature review for another project"	17	43.59%
<b>Inviting</b>	Being invited to apply or collaborate on project, or inviting someone to collaborate	"Contact from the program officer to solicit myself and colleague via e-mail to tell us to apply for a particular funding program." "I met with my collaborator (past and present) during a conference, and heard his idea of this topic (a survey, for which he already has partial funding for). He invited me to join him and submit a proposal to a different funding agency as the primary investigator." "After a bit (in the fall) I received an e-mail from the program officer asking if I would be willing to be engaged with [the funder] in ... the new funding cycle. This was the start of a more formal relationship."	7	17.95%
<b>Receiving</b>	Receiving relevant information, such as declination for prior proposal (and related reviews), notice of a funding opportunity, or receiving correspondence that sparks idea	"Got comments back from our first submission; they were so positive that we agreed we wanted to resubmit the proposal." "Received a new article (via e-mail) ... I was intrigued by the idea, so I "clicked" on it and read the entire article, then subsequently searched online and found a huge pool of research in this area." "I received a call for proposals by e-mail - and I was thinking of what I can do to get this grant."	7	17.95%
<b>Total</b>			<b>39</b>	<b>100.00%</b>

**Table 4.4: Categories within Determining Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY
<b>DETERMINING n=40</b>	Determining to apply or reapply for funding, alone or as a group, including actions towards a decision	"Contacted dissertation author (whose topic I discovered during that lit review) to use and modify her data collection instruments." "Had the proposal in mind when I came to [this institution] - I can't divorce it from the past."	2	5.00%
<b>Clarifying</b>	Clarifying proposal information or application process with funder, administration, or others	"Confirmed with the program officer via e-mail that we could submit a second revision" "Contacting the [sponsored research office] to tell them of this opportunity (by e-mail). I received a reply from them that I should contact [the funder] directly about the funding opportunity."	8	20.00%
<b>Deciding</b>	Deciding whether or not to apply for funding, add a partner for application, on a selected topic or method, or other relevant decisions	"Made a change in the personnel on the proposal based on the reviews. " "Once work published from the first grant, decided to form a second proposal." "Deciding who was going to take the lead on this application, what were going to be the roles, and who was going to be involved. "	8	20.00%
<b>Meeting/ Discussing</b>	Meeting with others, physically or virtually, to discuss potential application/proposal ideas	"Had a preliminary meeting to talk it over. Included several people who said they might be interested to talk over general idea, what [the funder] was looking for, and to be sure everyone comfortable in participating." "Attended a meeting with the person taking the lead for the main applicant of the proposal." "Set up phone meeting with program officer to ask questions - to ascertain if it was worth revising, and to go over reviewers comments."	7	17.50%
<b>Receiving/ Providing</b>	Receiving or providing support that provides the impetus for preparing or submitting a proposal, receiving requests for information from others, or providing responses to request for information from others	"Started getting e-mails from someone on the project management team asking for paperwork and details..." "My budget administration sent me an e-mail asking if I was participating and what was going on, and I explained what had happened up to that point ..." "Received an inadvertent course reduction in the fall that gave the impetus to move forward on this proposal."	8	20.00%
<b>Reviewing</b>	Reviewing reviews from prior proposal, and determining to submit again	"Reviewed the reviews of the prior submission - and determined to resubmit the proposal." " Took a look at the review comments, and realized we were probably grandfathered into be able to revise." "Read / reviewed the comments from the previous submission and decided which to respond to (what revisions needed to be made) - redefining the project."	7	17.50%
		<b>Total</b>	<b>40</b>	<b>100.00%</b>

categories from the content analytic scheme for step type, as described in Chapter Four, included the coding of all steps (n=419) collected from interviewing faculty regarding the steps they took (cognitive and cognitive/physical) during a recent proposal development experience. Steps were coded at the most specific level possible (category); however, if a step referred to multiple activities, it was coded at the meta-category which best represented that step. Although the majority of steps collected were assigned to categories, the allowance for multiple activities per step frequently reflected experienced respondent's tendencies to cluster certain types of activities together as "main steps" in their experiences. Steps were coded to meta-categories as "other" rather than one of the specific categories if a particular step fit sequentially and topically within the bounds of a meta-category, but the activity described did not necessarily apply to any of the given categories with that meta-category. Examples steps coded at meta-category and category levels are presented in Tables 4.4 -4.12.

**Table 4.5: Categories within Finding/Investigating Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY*
<b>FINDING/ INVESTIGATING n=41</b>	Preliminary research for data, literature, funding options, potential partners, research sites, etc.	"Had to learn from A-Z on how to assess this technique, so had to collaborate with folks at [a neighboring medical college] to access their equipment." "Researched potential collaborators... this was expertise I needed to effect the grant."	5	12.20%
<b>Analyzing/ Collecting</b>	Analyzing preliminary data for proposal or project; collecting or creating (by experiments) preliminary data for proposal or project; or collecting preliminary feedback	"Did some preliminary work on data that had been collected in a prototype of the proposed project ..." "Did analysis on the new data and felt like it was doable, but with some uncertainties." "Came back to the lab, bought the materials and tested the technique - for pilot data ..."	5	12.20%
<b>Identifying/ Contacting/ Partnering</b>	Identifying and/or learning about potential partners, funders, research sites; contacting partners or funders, <i>prior</i> to partnering; partnering with collaborators (and/or bringing in; adding on; involving) - the act of cementing the partnership; or comments regarding who was included in the project or proposal development	"Explored the idea of getting a grant for this course/ explored funding sources." "I got on [their] website and started looking around, and found a potential partner in 10 minutes. I e-mailed him and asked if he was interested (he agreed to partner)." "Consulted with the college research administrator on potential funders." "Contacted the program officer ... and asked to talk to him directly, so I saw him in Washington at Thanksgiving." "Started working on lining up the collaborations - the people who would be involved."	14	34.15%
<b>Researching/ Reviewing</b>	Initial research, including conducting pilot studies; reviewing existing literature for support of project or for relevant theories; or reviewing RFP or other funder materials (including websites) - as an individual, or as a group	"Read through RFP again to verify the contents." "Read a lot (after deciding to apply) to learn more on the topic." "Did research on the topic to see if anecdotal evidence supported the identified need." "Looked closely at the requirements." "The first step was the review of the literature for developments." "I said it should be a rigorous design - so I looked up the most rigorous design possible."	17	41.46%
<b>Total</b>			<b>41</b>	<b>100.01%*</b>

\* Total equals slightly less than 100% due to rounding error.

**Table 4.6: Categories within Planning Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY*
<b>PLANNING n=37</b>	Planning for project or proposal, alone or as a group, including planning for budget and other related components	"We "charged in", aiming for the regular October 1 submission cycle." "We were waiting for the package to come out (with all the necessary attachments). They have a rolling award approach ... but they look at new/renewal applications every year ..."	2	5.41%
<b>Assigning</b>	Assigning or dividing up of proposal or project development tasks, including self assignment	"Asked participants [PIs] to start writing up short descriptions of what they thought project was about." "I wrote most of the grant, but farmed out a few pieces to the different faculty members ... I assigned little tasks .". "Divided up tasks with collaborator for revising, rewriting and rethinking proposal."	5	13.51%
<b>Contacting/ Notifying</b>	Contacting administration or other relevant personnel to begin or inquire about proposal process or components, or to inform of impending submission	"Sent an e-mail to [the sponsored research office] to see when materials due." "Talked to my budget administrator to ask about next steps (such as the administrative letter of commitment)." "Contact with our center administrator, to tell her that the proposal was starting." "Approached my chair and the [sponsored research office] director about how to go about things in terms of budget. "	9	23.32%
<b>Developing</b>	Developing (or redesigning) of project or proposal, including outlines, research methodology or other components	"Developed a plan on how to address the need." "Refined the [the project] based on feedback "Developed my research questions - modified from the original author's work" "Spent time on IRB development."	8	21.62%
<b>Determining/ Thinking</b>	Determining project approach, partnerships; or thinking about proposal, approach, methods, or potential issues to address	"Did substantial rethinking of research question and premises." "Trying to foresee what my availability will be - what I already have committed; trying to determine my time on this proposal, and what can be allocated ." "Determined what sections of existing materials to expand, and what sections were missing." "Started to think through the details to gather framework for my approach."	8	21.62%
<b>Scheduling</b>	Scheduling proposal development, writing or other related activities	"Figure out the [Department] Chair's schedule and good time to contact the Chair." "Made a development schedule (but I did not stick to it) that involved addressing points that were weak in the initial proposal." "Found out the real due date (thought it was October 25, but it was really October 5) in mid September, so condensed my process."	5	13.51%
<b>Total</b>			<b>37</b>	<b>98.99%</b>

\* Total equals slightly less than 100% due to rounding error.

**Table 4.7: Categories within Composing/Organizing Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY*
<b>COMPOSING/ ORGANIZING</b> n=45	Composing & organizing proposal components or ideas, including rewriting/reorganizing of prior related materials	"Iterating a description of proposal itself - having people submit sections of text, and merging those sections." "Wrote the [proposal] regarding requested support from the Foundation, reviewed it with the college research administrator, and revised it."	2	4.44%
<b>Consolidating/ Reorganizing/ Revising</b>	Consolidating, organizing or piecing together of written parts and/or proposal components; and revising, reorganizing, updating or rewriting of proposal components or ideas, often based on feedback or reviews from others (or own review)	"Used another proposal I had submitted (but was rejected for) as a reference to create [this] proposal - especially for methodology - which was the same (just a "cut & paste") but changed introduction." "Somebody consolidated all of the pieces into one document." "Did my parts of the revision/writing." "Based on feedback from participants, dropped [a] portion of the assessment to make them more comfortable."	20	44.44%
<b>Working</b>	Completing some type of work on the proposal or development of proposal, alone or as a group, during composing and organizing period, such as working on budget, or checking proposal requirements	"Took the uncertainties/questions after data analysis and worked them into [the] proposal." "Read over again the requirements for the proposal in more detail." "Got assistance in putting all references into RefWorks (bibliographic work) during the summer." "Worked with the budget manager to come up with numbers for the letter of commitment."	9	20.00%
<b>Writing</b>	Writing and organizing of proposal components or ideas	"Started writing - after cutting and pasting, started writing things that were missing." "Wrote the revised proposal. All three people contributed." "As happens when I haven't written with the involved partners before, I took the first stab at proposal draft. " "Spent a few months flushing out the proposal (I had a graduate assistant helping me) - especially wrote to the program [funder's] needs."	14	31.11%
<b>Total</b>			<b>45</b>	<b>99.99%</b>

\* Total equals slightly less than 100% due to rounding error.

Apart from the few steps assigned to the meta-codes, the minimum number of steps coded in each category was five, which occurred for the categories of Analyzing/Collecting, Assigning, Scheduling, Adding/Inviting, and six for the category of Meeting. The largest single occurrence of steps in a category was thirty maximum steps coded into the category Submitting (in the meta-code Finishing – Table 4.12). There were also two instances of categories with twenty steps apiece – Consolidating/Reorganizing/Revising

(in meta-category Composing/Organizing – Table 4.7) and Reviewing (in meta-category Checking – Table 4.11). The remaining categories contained between seven and seventeen occurrences of steps.

**Table 4.8: Categories within Circulating Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY*
<b>CIRCULATING</b> n=36	Circulating of proposal versions or components between partners or research administrators for review (including multiple rounds or cycles). Includes virtual and physical circulation of ideas and participants through meetings, presentation and discussions	"Rounds of revisions/edits, where people gave comments - sent by e-mail primarily, but in person meetings were an essential part of this process." "Involved [my college research administrator] in the full proposal; had her go over the materials."	3	8.33%
<b>Cycling/ Editing</b>	Cycling (passing back & forth; rounds) of proposal versions or components between partners or research admin.; including going through rounds of editing with others or oneself	"Doing editing." "Circulated drafts for comments to project team and participants for comments and edits - everyone got to say what [part] they were doing" "Started cycling partial drafts between the 3 of us." "Handed back and forth different portions of the proposal for editing."	8	22.22%
<b>Meeting</b>	Meeting, discussing or talking about proposal drafts or components	"A meeting was called of everyone involved in application..." "Round of meeting ... to focus on taking the pieces in and to change the methodological approach (based on our evidence)." "Talked to my college research center - to see what we needed to do."	6	16.67%
<b>Requesting/ Receiving</b>	Requesting reviews or sending/giving materials to others with stated or implied request for review; requesting components or requesting new partnerships; gathering of reviews; or receiving reviews or review material	"Received comments on the draft from the program officer for revisions." "I started contacting experts ... for authoritative "stamp of approval" on idea." "Gathered feedback on draft from college level research administrator, on salability and marketability." "Gave a first draft to my collaborators ... for reviews."	12	33.33%
<b>Reviewing</b>	Reviewing of proposal drafts or components, or review of funder materials or literature to clarify direction or parts of proposal.	"As part of this we reviewed the evaluation framework." "[She] especially focused on something she thought was too vague - that there was not enough evidence for." "Did [more] literature review - This one was less about finding gaps, but more for finding support for why this study is important - validating the topic."	7	19.44%
<b>Total</b>			<b>36</b>	<b>99.99%</b>

\* Total equals slightly less than 100% due to rounding error.

**Table 4.9: Categories within Addressing and Budgeting Meta-Categories**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY*
<b>ADDRESSING</b> n=28	Administrating proposal development tasks OR Addressing needs, roles, weaknesses or administrative hurdles identified during proposal development/ project planning, including dealing with problems and time constraints	"I produced [another] mini application in response to the denial for my request ..." "December happened" - short amount of time now ... We had plans to finish in December and polish the proposal over Christmas break, but realized in mid-December that we had pretty much 3 weeks to get this in. Part of this pressure was ... new internal deadlines, which was making us lose a week."	3	10.71%
<b>Adding/ Inviting</b>	Adding and/or inviting new partners/collaborators	"Sent potential participants [the proposal]. Time was short at this point so did not ask other participants to write - just asked them if they were willing ..." "Added new participants. I recruited a bunch ... while a few were recruited by other CoPIs ..." "Recruiting outside partners. It was important to this proposal to recruit outside, from non-academic organizations." "Solicited another collaborator."	5	17.86%
<b>Administrating</b>	Addressing administrivia, including administrating proposal development OR Addressing needs, problems, roles, weaknesses or administrative hurdles identified during proposal development and/or project planning	"Had to determine what part my [collaborator] plays - I asked him to flesh out his role (because it wasn't obvious - but he was the well connected one, and we needed him in this proposal)." "E-mailed chair because if I got the grant I would need to buy out a course - so we had to agree on what semester." "Administrative stuff - we get help for this from the administrators (budget, paperwork, documents ...)" "Lots of herding of cats involved (four other PIs at two other institutions with budget summaries and site descriptions now necessary)."	10	35.71%
<b>Working / Discussing</b>	Working on proposal, including working on organization of project or working with administrators (research or otherwise); or discussing issues in proposal development	"Met again with [my research administrator] to discuss logistical issues." "Conference call between the new collaborator, the original collaborator and myself. [He] had the details worked out about the data management plan and how the experiment would be working." "Started working on the research parts (research strategy -12 pgs; budget justification."	10	35.71%
<b>Total</b>			<b>28</b>	<b>99.99%</b>
<b>BUDGETING</b> n=15	Preliminary or primary budgeting for proposal, including rebudgeting of prior related proposals	"Figuring out the budget." "Working on the budget. Complicated due to parts of proposal which that would fund ongoing research, while other parts (conferences, etc.) occurring at specific times." "Developed the budget, in conjunction with [our] research administrator." "Dealing with the budget."	15	100.00%

\* Total equals slightly less than 100% due to rounding error.

Some activities were repeated in the meta-categories, as evidenced by the similar names for these categories; however the definitions were slightly different for each based



on the occurrence of these similar activities within different points of the proposal development process. For example, the category Reviewing was repeated as a component of four meta-categories: Determining (Table 4.4), Finding/Investigating (Table 4.5), Circulating (Table 4.8), and Checking (Table 4.11). Revising was another common

**Table 4.10: Categories within Wrapping Up Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY*
<b>WRAPPING UP n=42</b>	Wrapping up of proposal development tasks, including completing collecting, notifying, polishing, prodding, writing	"Everyone involved needed to sign off on proposal; provide COIs, Current & pending docs; running around (physically) ... 2 pg bios had to be collected and/or created ..." "Worked on recruitment plan ."	4	9.52%
<b>Collecting/ Prodding</b>	Collecting necessary paperwork and proposal components, including prodding partners to provide necessary materials	"Collected signatures for the [institutional] form - (chair, Dean, PI)." "Had to collect additional paperwork (biosketches, etc.)" " "I was at the same time trying to get people set - their part was being done as a 3rd collaborative proposal. It took a little prodding." "Try to keep reminding people to get me their biosketch. "	7	16.67%
<b>Completing</b>	Completing proposal development tasks, including other completing other elements of proposal besides narrative	"Completed IRB. This isn't research, but we still needed to write up an IRB application, which needs to be submitted." "Got proposal support team at mobilized to complete the required 63 page packet." "At the same time, completing all the little things (bio sketches, etc.)"	7	16.67%
<b>Notifying</b>	Notifying administrative offices, such as Dean's Office, Center/Institute, College or Central Research Administrator (or Office of Sponsored Programs), or Foundation Relations of impending submission	"E-mailed or called [the sponsored research office] to say I was coming in with the materials ." "Notified the [sponsored research office] that a proposal was in the works." "The college research administrator notified Foundation Relations of an impending submission." "Contacted the Senior Associate Dean for Research ..." "Making the Chair aware of submission & have them sign the [institutional] form."	8	19.05%
<b>Polishing/ Revising</b>	Polishing, revising, updating and/or editing of proposal components	"(Close to deadline) a narrow group of people polished document in terms of program solicitation specifics ..." "Massaging of budget due to salary issues and cost share requirement." "Updated facilities/ environment statement for the proposal." "Revisions to the budget to reflect the change of roles."	9	21.43%
<b>Writing</b>	Writing proposal draft or components	"I wrote a couple more pages over the weekend." "Writing of the proposal." "Continuing to draft the narrative."	7	17.67%
		<b>Total</b>	<b>42</b>	<b>101.01%</b>

\* Totals equals slightly more than 100% due to rounding error.

**Table 4.11: Categories within Checking Meta-Category**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY
<b>CHECKING</b> n=45	Reviewing and revising proposal (including formatting), including anticipating difficulties or identifying outstanding items, and meeting to facilitate review	"Had Co-PI at same time review and edit proposal, and work on budget."	1	2.22%
<b>Anticipating/ Identifying/ Questioning</b>	Anticipating difficulties or troubleshooting for problems in proposal development or submission, including identifying outstanding items; and questioning or clarifying of proposal items	"Fielded questions from [the sponsored research office] about proposal for final submission." "Proposal had to go to [the sponsored research office], who noted some questions on the budget." "Trying to set up an agreement with another collaborator ... that I anticipated being a problem, so I skirted around it."	9	20.00%
<b>Meeting</b>	Meeting or approaching someone about proposal draft or components, or to request review or approval	"Met with [the funder] regarding administrative items." "Met with the grant team to wrap it up." "Approached the Dean for approval, [who then] approached our fiscal person."	7	15.56%
<b>Reviewing</b>	Reviewing full proposal or proposal components, including contacting other to request review, or receiving reviews	"Had someone else review the proposal draft (basically for grammar) ." "Submitted final draft via e-mail to the Program Officer for his review before it went through institutionally." "Review of the proposal by the [sponsored research office]." "Reading through the whole final draft - deciding if it's ready to go."	20	44.44%
<b>Revising/ Updating</b>	Revising, massaging, updating or editing of proposal or proposal components, such as narrative, budget, biosketches ... including formatting including formatting	"Made revisions/edits to the draft." "Final revision to draft, boiling down to two pages." "Had to rewrite ... the statement of work." "Updated the budget to reflect participant recruitment needs."	8	17.78%
<b>Total</b>			<b>45</b>	<b>100.00%</b>

category, included in three meta-categories (Composing/Organizing – Table 4.7; Wrapping Up – Table 4.10; and Checking – Table 4.11); as were Reviewing (found in meta-categories Determining – Table 4.4, Circulating – Table 4.8, and Checking – Table 4.11) and Meeting (found in the same meta-categories as Reviewing). This repetition of categories across meta-categories strengthens the model by recognizing the different points at which some users experienced particular steps during the development of their proposal, and by allowing for repetitive tasks – such as reviewing drafts or proposal

components, meeting for proposal planning or development, or revising components of a proposal.

**Table 4.12: Categories within Finishing Meta-Categories**

CATEGORY	DESCRIPTION	EXAMPLES	COUNT	FREQUENCY
<b>FINISHING n=43</b>	Finishing up - submitting proposal components internally or full proposal externally, compiling components and paperwork, finalizing of proposal or components, and sending items to research administrators or funder	"Completed proposal and logistical items." "Talked with College Research Admin; modified the budget and resubmitted (including resubmission through [the sponsored research office])." "Finalized the narrative portions and submitted it to [the collaborating institution]."	5	11.63%
<b>Compiling/ Finalizing</b>	Compiling of proposal components and paperwork for submission, including printing out of necessary copies; or finalizing of proposal drafts or components, including budget	"Went back to the proposal, and finalized everything." "Print out all components of the grant ([the funder] wanted 3 printed copies)." "Whole thing compiled by [our] research administrator, and finalizing of forms." "Put all the pieces together."	8	18.60%
<b>Submitting</b>	Submitting (or sending, giving, passing off) of proposal components within the institution and/or externally to the funder	"Physically walked it over to the [sponsored research] office - I hand delivered it to them - I always do." "Submitted final draft to [the sponsored research office] for institutional submission, review and approvals." "Provided application packet to the [sponsored research office], then we submitted directly to [the funder]."	30	69.77%
		<b>Total</b>	<b>43</b>	<b>100.00%</b>

As shown previously in Figure 4.2, the 11 sequential (yet flexible) meta-categories of the model are composed of 37 non-sequential, specific categories of common activities during proposal development. These categories are labeled with terms drawn from interviews with faculty who recently submitted a proposal. By employing the actual verbal expressions of cognitive and cognitive/physical steps that respondents took during the development of a proposal – and representing the order in which they were taken – this model provides a powerful means of reflecting user-experiences, which can then be used as a tool for enhancing service to users through the incorporation of the model in the design or facilitation collaborative proposal development activities. Chapter

Four now moves from the descriptions of categories and meta-categories of the model, to employing these categories to present a representation of the type of questions and constraints experienced by users during proposal development.

#### **4.4 Analysis of Questions and Constraints**

After the collection of steps during the interview process, respondents were asked to pick out the trickiest or most difficult point during that process, and then list the questions they had or constraints they felt at these points. As discussed in Chapter Three, both questions and constraints were employed for this study as the operationalization of a user's gap in understanding during the problem/situation.

Questions and constraints varied by situation, and respondents often expressed a number of questions or constraints regarding this same topic. For instance, one respondent had five questions for the same step during the Beginning category. Of these five questions, three were related to questions about the potential funder, including: what the scope of funding would be for a particular project; what their desire was (if any) for empirical research on the topic; what their level of engagement was for this new program (i.e., how committed to it were they). Other clusters of questions per situation included those regarding design (e.g., design of the project or design of the proposal); institutional procedures; and budget. Table 4.13 below presents examples of questions and constraints perceived by respondents during their proposal development situations. Each example was given for a specific step as identified by the respondents, and therefore are presented in Table 4.13 in the model meta-category for which their related step was coded. Table 4.13 also shows the frequency of occurrence of questions and constraints between the meta-categories of the proposal development model of faculty cognitive behaviors.

**Table 4.13: Examples of Questions and Constraints per Meta-Category & Frequency of Occurrence**

META-CATEGORY	DESCRIPTION	# of Qs & Cs	FREQUENCY*
BEGINNING	QUESTION: What funding has been set aside for this program? CONSTRAINT: My lack of knowledge about this kind of data, and the methodologies for investigating this kind of data.	19	10.98%
DETERMINING	QUESTION: What is the purpose of this project? What is the goal? CONSTRAINT: Time. I had to be really protective of my time.	28	16.18%
FINDING/ INVESTIGATING	QUESTION: The Program Office brought up the question, "Who else might we need to work with if we went on further ... will we need other expertise? CONSTRAINT: I did not originally consider this issue [for] the new method.	8	4.62%
PLANNING	QUESTION: We were hearing the budget for this program was going to be cut, and we were wondering if this was going to happen? CONSTRAINT: I didn't know [my] Co-PI that well.	15	8.67%
COMPOSING/ ORGANIZING	QUESTION: If I want to make this idea look more convincing to readers/reviewers, I have to make the case for why [this] design is rational; what theories support this idea? CONSTRAINT: Time! With a full-time teaching job, research responsibilities and work on a new book, time is a real issue.	23	13.29%
CIRCULATING	CONSTRAINT: You have a limited number of pages to make your case. QUESTION: Who do I need to involve or notify?	15	8.67%
ADDRESSING	QUESTION: Why isn't there a procedure for this - one that is managed in a way to get the information they want right away? Or at least clear communication to faculty that these are two different [issues]? CONSTRAINT: [The partner institution] was closed because of 6" of snow, and my Co-PI got in a car accident at 4:00 AM on the way home from a trip."	24	13.87%
BUDGETING	QUESTION: What funding is needed for each part of the proposal? CONSTRAINT: Felt constrained to keep the budget under some unknown threshold."	9	5.20%
WRAPPING UP	QUESTION: How do I do this? What are the appropriate procedures here? CONSTRAINT: I was amazed at the lack of help and support. It was all on my shoulders to do everything.	8	4.62%
CHECKING	QUESTION: What are the things that I need to complete, and what are the things [the sponsored research office] needs to complete? CONSTRAINT: I was fractured. It was hard to maneuver this bouncing back and forth, between answering e-mails [on these issues] and conducting meetings.	15	8.67%
FINISHING	QUESTION: What are the (if any) lingering logistical or regulatory issues? CONSTRAINT: The requirement of a hard-copy submission by the funders, plus collecting all the physical signatures on it - going from building to building.	4	2.31%
OTHER		5	2.89%
Total		173	99.97%

\*Total equals less than 100% due to rounding error.

As illustrated further in Figure 4.5, questions and constraints were contained in all meta-categories of the model, which means that there was no one trickiest point, *per se*, identified during proposal development. However, there were definitive areas with greater and lesser occurrences of questions and constraints, such as the meta-category of Finding/Investigating (within which 12.2% of steps were coded) which contained only eight questions and constraints (of 173 total) identified by respondents for that period. The low occurrence of questions and constraints for this meta-category could be explained by the more simplistic and solitary nature of the tasks within it (see Table 4.5 for example steps in this category). Most steps for this meta-category included individuals work online to identify relevant research, data, potential partners, funders, and so forth.

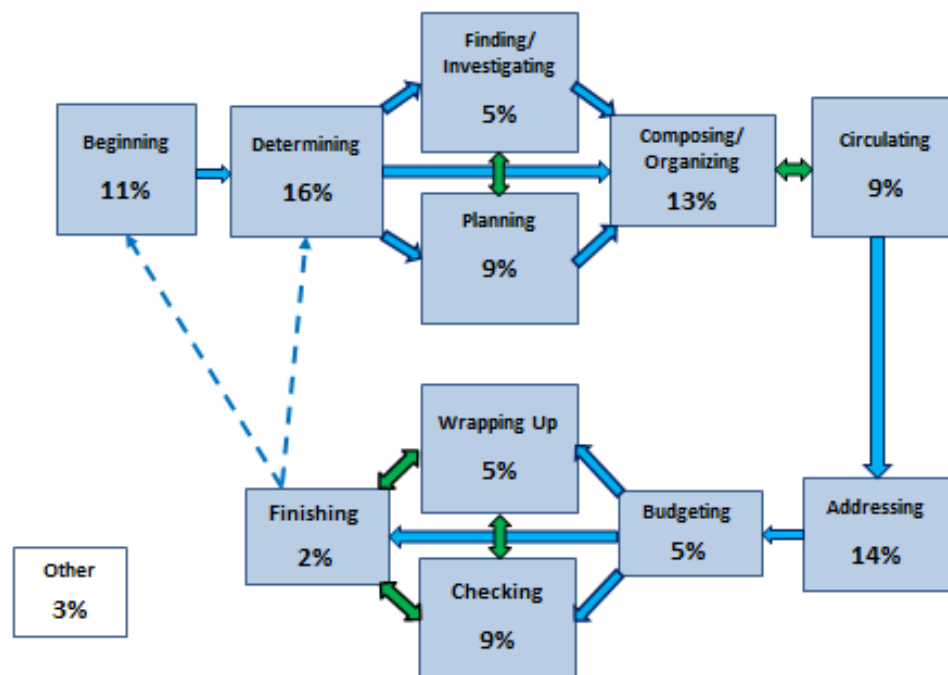


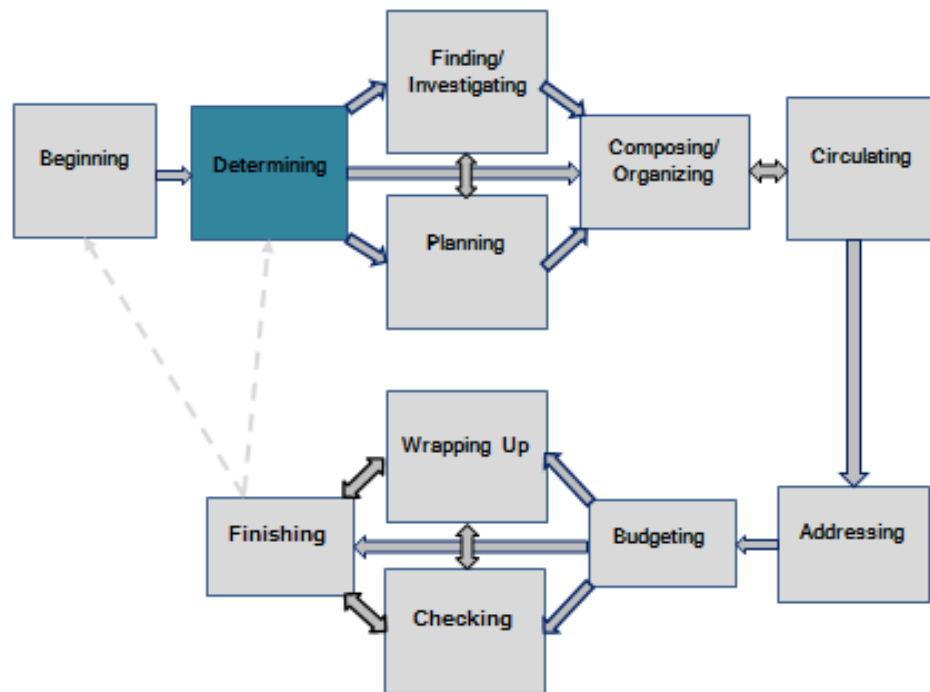
Figure 4.5: Percentages of Questions and Constraints Per Meta-Category of Model

In comparison to the small number of questions and constraints perceived by respondents at the end of their proposal development experiences, a number of questions and constraints were given for the period represented by the second meta-category in the model – Determining. Questions and constraints surrounding steps coded for within this meta-category represented 16% of all question and constraint occurrences. Determining included clarifying proposal information or processes, meeting about or discussing the proposal, reviewing prior unfunded proposals, and deciding about whether or not to apply. The decision-making nature of this meta-category for step type resulted in a slew of questions and constraints related to the funder, the design of the project, and the nature of collaborations or availability of collaborators.

As illustrated in Figure 4.5, there was also a moderate occurrence of questions and constraints in both the fifth meta-category (Composing/Organizing) and in the seventh meta-category (Addressing). The balance of questions and constraints were spread across the seven meta-categories, which indicates the uniqueness of situations to individual experiences. Overall, however, there was an emphasis of question and constraints towards the front end of steps surrounding proposal development. Fifty-four percent (54%) of questions and constraints were given related to steps coded in the first five meta-categories of the model, while only thirty-five percent (35%) were given by respondents in relation to steps coded in the last five categories of the model. This predominance of questions towards the beginning of proposal development experiences becomes more interesting when the nature of questions and constraints are examined.

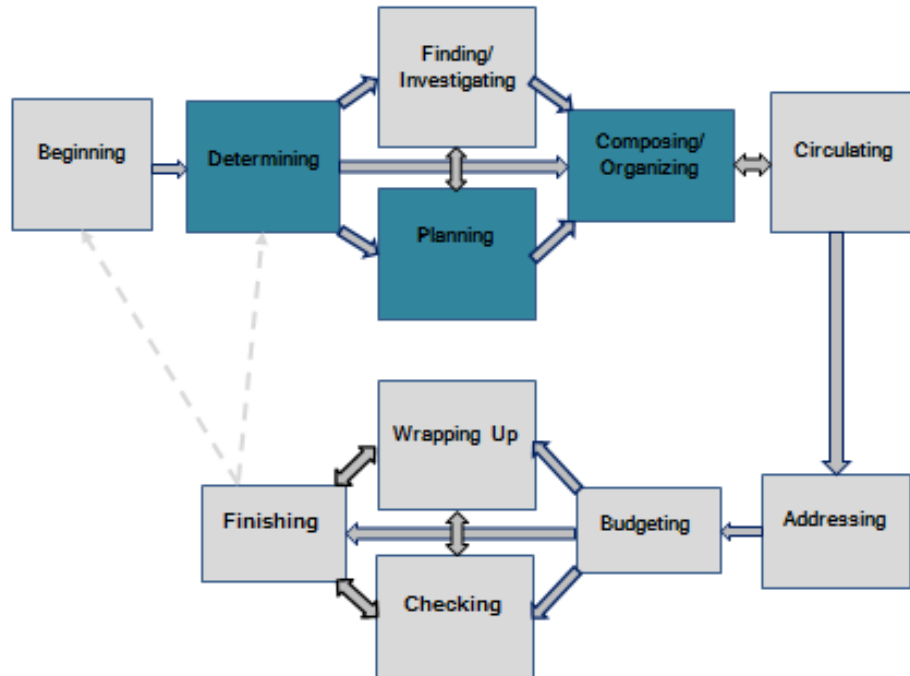
### *Phases of Proposal Development*

As with the type of steps per situation, there was a certain amount of repetition in the nature of questions over the course of the development of a proposal. While questions concerning funders or potential collaborators dominated for steps during the Determining stage of proposal development (illustrated in Figure 4.6), questions and constraints regarding project or proposal design were clustered in three areas: the second meta-category of Determining (the meta-category with the greatest number of questions and constraints across the model); the fourth meta-category of Planning, and the fifth meta-category of Composing/Organizing (illustrated in Figure 4.7).



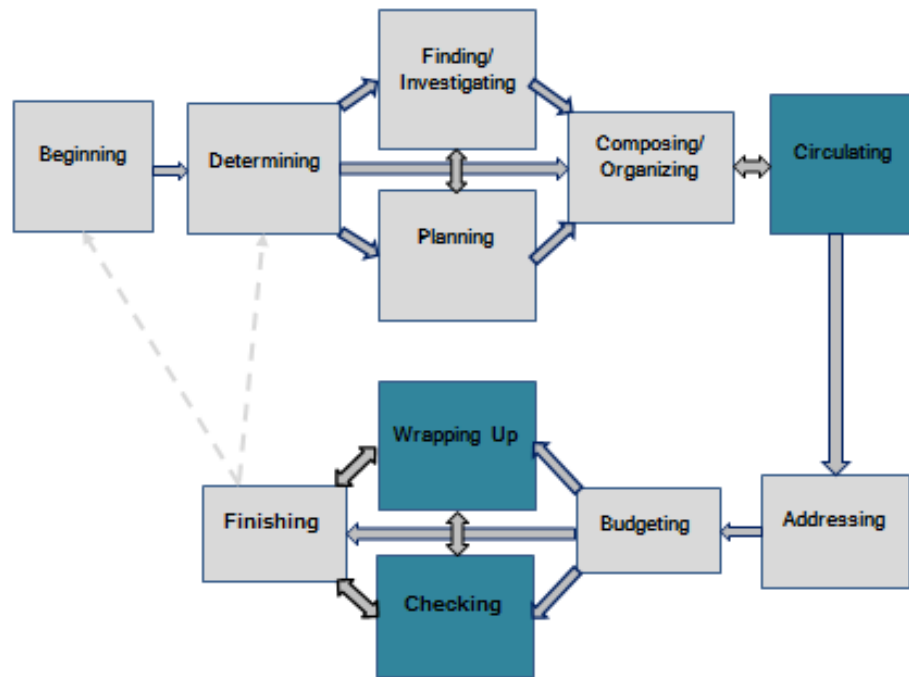
**Figure 4.6: Concentration of Questions Regarding Funders & Collaborators**





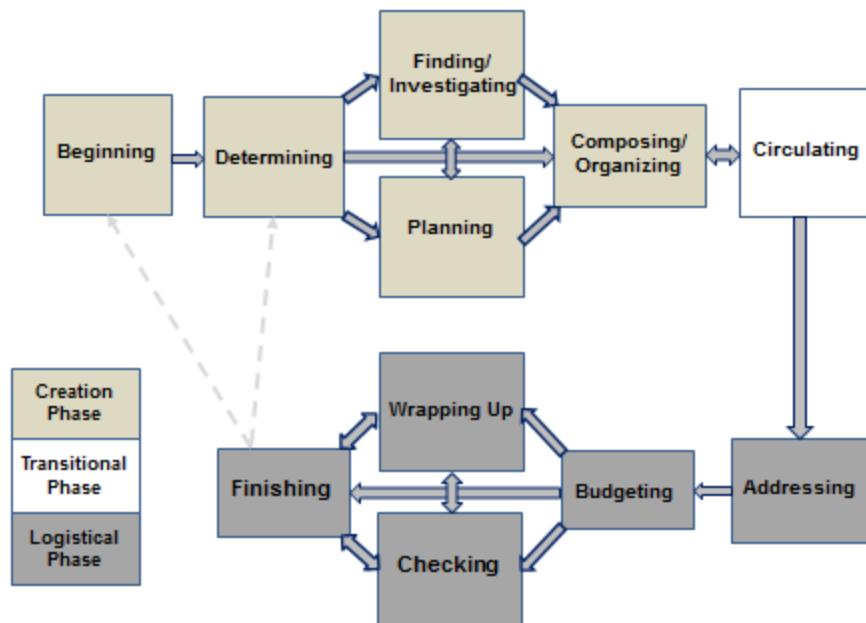
**Figure 4.7: Concentration of Questions & Constraints Regarding Project & Proposal Design**

In comparison to the nature of questions and constraints in the first half of the model, there was a preponderance of questions and constraints regarding institutional procedures and policies in the second half of the model (illustrated in Figure 4.8). These types of questions begin with a large number of occurrences in the sixth meta-category of the model (Circulating), and again during both the eighth and ninth meta-categories (Wrapping Up and Checking). This weight of issues related to institutional procedures seems to naturally fall closer to the submission point in the situation of proposal development.



**Figure 4.8: Concentration of Questions & Constraints Regarding Institutional Policies & Procedures**

The nature of questions and constraints as clustered within different meta-categories of the model can be used to define two distinct phases in proposal development. The front-loading of design related questions and constraints, and exploratory or determining questions regarding funders and potential partnerships, can be represented as the “Creation Phase” towards the beginning and middle of situations of proposal development (illustrated in Figure 4.9 as the first six meta-categories of the model). The nature of questions and constraints collected for this study also support a second more administrative or “Logistical Phase” in the latter half of the development of a proposal (illustrated in Figure 4.9 as the last six meta-categories of the model). The middle or sixth meta-category of the model – Circulating – represents a transitory period of proposal development, where question, constraints and steps of both creation and logistical natures are equally represented.



**Figure 4.9: Division of Proposal Development into Creation & Logistical Phases**

This division of the proposal development process into two phases, as determined after data analysis, is also supported by the terminology drawn from the original interviews. These terms – taken from the respondents’ descriptions of steps during their proposal development process – were used to name the categories of the model (e.g. Identifying, Clarifying, Deciding, Researching and Developing as “Creation” terms vs. Administrating, Budgeting, Completing, Notifying, Updating and Compiling as “Logistical” terms, for instance). The breaking of the proposal development process into two phases is also echoed in the terms assigned by the researcher during data analysis for the abstract meta-categories (e.g., Beginning, Determining, Finding/Investigating vs. Addressing, Wrapping Up, Finishing).

The identification of the Creation and Logistical Phases of proposal development enabled by this study add to the potential benefits to be gained by incorporating attention

to cognitive behaviors in the field of research administration. This study has provided evidence that situations of proposal development spark questions and constraints at all points in the process, but particularly in the first half or Creation Phase of development. By shifting a portion of the focus of research administrative services and resources to the cognitive needs of faculty during the true “developmental” period or front end of proposal development, rather than completely focusing on the compliance-based and/or procedural elements of the more logistical periods (e.g. towards submission), institutions could provide more holistic support of this integral activity in higher education.

#### **4.5 Proposal Development: Situational Characteristics**

As noted in Chapter Two, the methods of this study incorporate a focus on respondents’ movements through time and space in order to derive commonalities from a variety of experiences. This transferability of unique situations to universal aspects of information seeking and use is possible due to the similar ways in which individuals make sense of their situations through time and space, as proven through previous empirical studies (Dervin, Nilan & Jacobson, 1982; Newby, Nilan & Duval, 1991; Nilan & Mundkur, 2007).

As noted earlier in Chapter Three, sample selection for this study was deliberately designed to enhance variance across situational experience, in part through post-interview preliminary reviews of data, but also through purposeful and snowball sampling. Purposeful sampling was the deliberate selection of potential participants based on demographic and other static characteristics, while snowball sampling was the use of respondents to help identify and link to potential additional participants. Table 4.1

displayed some of the characteristics included in the identification of the sample pool, including the number of respondents per gender, per seniority, and per federal and non-federal funding applications.

The rounds of physical card organization during the development of the content analytic scheme for step type were also described in Chapter Three. The third round of physical step card organization was carried out specifically to visually inspect for significant differences between steps collected from junior faculty and senior faculty (i.e., assistant professors vs. associate and full professors) as one demographic characteristic which was thought might have impact on the number and nature of steps during proposal development. Nine situations of each type, by tenure of respondent, were analyzed in this manner. This visual analysis of steps showed no appreciable difference between step occurrence by type or volume between junior and senior faculty for situations of proposal development.

For verification of this visual analysis this exercise was repeated with a separate randomly selected sample of 18 situations (nine for junior faculty and for nine senior faculty). The second visual analysis of steps based on tenure provided an even greater balance of representation between step meta-categories. To extend this visual analysis, a comparison was conducted between junior and senior faculty demographic characteristics and proposal type, as shown in Table 4.15. Though the divergence in years of experience was obvious between the groups (an average of five years for non-tenured or “Junior Faculty” and an average of 22 for tenured or “Senior Faculty”), and the number of faculty and/or senior researchers on the proposal was greater for Senior Faculty, the average length of development for the proposals, the average number of steps given per situation,

and the average number of questions and constraints received were almost equal (though the maximum number of questions was greater for Junior Faculty). Both the multiple

**Table 4.14: Comparison of Junior and Senior Faculty across Situations**

	# of Depts	M/F	Avg Yrs Exp	Avg # of Faculty	Fed/ Priv \$	New/ Resub	Avg # Months	Avg # Steps	Avg # Ques/Cons
<b>Junior Faculty</b> (n=16)	11	7/9	5	2*	9/7	6/10	3	15**	7
<b>Senior Faculty</b> (n=11)	6	7/4	22	5^	7/4	5/6	3	16^^	6^^^

\*With a concentration of experiences with 1-2 faculty or senior researchers on proposal (12 of 16).

\*\*Range of steps was from 6 to 27, with more than half concentrated between 13-20 steps per situation (10 of 16)

^ Senior faculty were more likely be PIs, with 8 of 11 experiences involving 3 or more faculty/senior researchers.

^^ Senior faculty had no less than 11 and no more than 22 steps per situation.

^^^No more than 8 questions per situation were given, compared with up to 15 listed by junior faculty.

rounds of visual analysis of step cards, and the analysis of demographic characteristics and proposal type for number of steps and questions provided support for the unremarkable nature of one particular demographic variable (tenure) on situation.

The point of this study was not to ignore demographics, but instead to enhance understanding a user's particular problem/situation (proposal development) through an investigation of information behaviors. Others have noted that "such static attributes as demographic, psychological, and geographic descriptions of users, all conceptualized as across time-space identifiers" are common to user studies (Souto et al., 2008, p. 4). The purpose of this study, however, was to incorporate a wide variety of such attributes among individual experiences to weave and investigate the intricate tapestry of the proposal development experience. From this tapestry, patterns of information behavior emerged – common across multiple seemingly disparate experiences in relation to the

time and space of the respondents, and in spite of a deliberate attempt to sample across demographic categories. The resultant synthesis of these patterns was presented earlier in Chapter Four as a dynamic and iterative model of faculty cognitive behaviors during proposal development.

#### **4.6 Chapter Four Summary**

The tables and discussions provided in Chapter Four detail a variety of insights into the problem/situation of proposal development through identified patterns of behavior revealed by this user-based study. While Chapter Three discussed the methods selected for this study, detailing the overall study design, and in particular the methods for model development in direct response to the second research question, Chapter Four presented the notable findings from this study, including a model of faculty cognitive behaviors during proposal development.

The proposal development model of faculty behaviors presented in this chapter contributes to the field of research administration by describe the natural cognitive elements of common situation in higher education. It also helps represent (and potentially address) issues of users' movement from one stage of the model to the next. This is done by identifying the types of questions and constraints, as has been discussed above, in relation to their common occurrences at different points during the development of a proposal. The model, then, could be employed in the following ways:

- As a navigational tool to help a user orient himself/herself the process (to determine potential next steps, impeding decisions, or possible issues);

- As a means of informing and improving proposal support services or resources, by identifying common user needs in relation to points in the process, then linking resources and/or improving services to respond to those needs (e.g., a user-based, cognitively-focused enhancement to traditionally compliance-based, task-driven institutional service structures);
- And as a way to co-orient all potential stakeholders in the development of proposals, and engender collaborative activities in support of common goals.

The utility of the model – as a reflection of cognitive perceptions of faculty during proposal development – is not persistently dynamic, but it could remain so by two deliberate means: 1) Through continued user-based investigations, such as that described in this thesis; or 2) The formalization of this model in a proposal development support system which incorporates the ability for users to continually update and contribute to the model. This potential application of the model discussed further in Chapter Five.



## **CHAPTER FIVE: Discussion and Recommendations**

### **5.1 Introduction**

Chapters One through Four responded to the research question: *How can a user-based investigation be employed to define and describe information behaviors during proposal development?* This included identifying the potential utility of incorporating an awareness of the cognitive behaviors of faculty to enhance practices in research administration. As an extension of this last point, Chapter Five addresses a second question: How can findings regarding information behaviors during the development of proposals be employed to inform design, delivery and facilitation of services and resources by research administrators? This discussion focuses on the potentials for implementation of findings from this and future studies, and emphasizes the importance of and potential for the development of collaborative proposal development activities.

### **5.2 Implications of Study**

#### **Implications for the Model of Proposal Development**

This study represents a rigorous application of a user-based *investigation of information behaviors surrounding proposal development*. The value of a user-based investigation of information behaviors was established in Chapter Two, through discussions of relevant studies conducted in this manner. For example, Ellis's study of the information behaviors of social scientists, which established a methodological foundation for investigating information behaviors as a means to informing information systems design (1993); Grimshaw and Wilson's qualitative examination of user needs in

higher education during the research process (2009); and Nilan and Fletcher's investigation of the information behaviors of NSF-funded researchers during proposal development (1987). Chapter Two also specifically discussed the value of employing methods based in the Sense-Making Methodology for conducting user-based information behavior research, as exemplified by numerous studies (for example, Dervin and Dewdney, 1986; Nilan & Fletcher, 1987; Dervin et al., 2006; Souto et al, 2008).

The value in these methods also rests in their potential to generate useful insights for both research and practice through the co-orientation of one individual's experience (the user) with another's (e.g., the researcher or practitioner). A user-based study conducted in this manner provides for the bottom-up, empirical investigation of the cognitive behaviors of using surrounding a common activity. By detailing a mechanism for collecting and representing user perceptions (and the results from one such study), this thesis provides a means for supplementing both the primarily regulatory structures of research administration, and traditional demographic-based examinations of research activity in institutions of higher education, with specific insights regarding the needs of faculty during proposal development.

As part of this effort, this study investigated and confirmed the presence and influence of across time-space characteristics of proposal development – more specifically the commonality of steps between situations, despite established variations in these situations. These steps were derived from the cognitive (what users are thinking and feeling) and cognitive/ physical (what they are doing and where they are doing it) aspects of user experiences during proposal development. The importance of these considerations was originally proposed by Nilan and Fletcher (1987). In both studies, the cognitive and

cognitive/physical activities surrounding proposal development (steps) were collected in the articulation order of respondents. These steps were then analyzed across situations (while maintaining their original temporal order) in order to develop models of proposal development.

Both the proposal development model of faculty cognitive behaviors presented in Chapter Four, and the original Nilan and Fletcher model (1987) are user-based representations of experiences, which employ terminology drawn from numerous interviews with faculty from a variety of proposal development situations. Additionally, the model developed from this study incorporates multiple areas of allowable iteration between meta-categories of steps to provide flexibility in application to a wide variety of proposal development situations. These features have been discussed in relation to their value in enabling users to recognize and orient their processes in relation to the model. These are also the features which would support the model as a means for dynamic, user-based systems design. The meta-categories and categories could be used as navigation features for a proposal development support system, which could help link users to resources based on their location in the model. Such linking would be further accentuated by including resource provision informed by the questions and constraints users faced at particular points in their experiences – their gaps in understanding when they were developing a proposal.

In order to remain relevant and reflective of user needs, such a system would need to accommodate contributions from all types of “users” – the stakeholders in the proposal development process. Such contributions could be in the form of additions of questions or constraints in relation to particular points on the model (e.g., a dynamic version of

FAQs). In this manner, questions perceived by a user but not previously represented in relation to a particular step covered in the system could be inserted. Other users could respond to questions and constraints listed with reflections of their own experiences, and/or add additional resources to help respond to the identified need. Such responses could come from research administrators, other proposers (e.g., faculty, research staff, graduate students) or even funders, if given access to the system.

This model is not, however, a one size fits all account of the proposal development experience for all stakeholders in the process. Instead, it serves as a representation of cognitive behaviors from the faculty perspective, as a means to help other participants/stakeholders understand this perspective. While the model may not seem applicable to the experiences of other types of stakeholders (or descriptive of their problem/situation of proposal development), it can be used to increase understanding between stakeholders by adding insight – to help identify and respond to the needs of faculty as users of research administration services and resources.

In this way, the proposal development model of faculty cognitive behaviors expands (not supplants) the examples of research administration-based models presented in Chapter Two. This model could be used to help other faculty better understand and navigate this complex process in higher education – as a means of sharing the experiences of others. It could also be used inform the facilitation of proposals by research administrators, and perhaps to build greater understanding between funding agencies and academic institutions through recognition of faculty perceptions of the process. The value of such insights into the steps taken by faculty during the creation of proposals is further enhanced when combined with the identification of perceived gaps in

understanding of faculty during this process in relation to particular steps taken. The implication of the identification of these gaps is discussed in the next section.

### **Implications Regarding Gaps during Proposal Development**

For this study, gaps in user understanding – representing a pause or stop in the movement of the user through a problem/situation – were operationalized by having users describe the questions they had or constraints they perceived during the development of a recent proposal. Chapter Four included examples of questions and constraints collected in this study, as presented within the meta-category of the step from which they stemmed. The frequency of questions and constraints per meta-category in the proposal development model were also given in Chapter Four, and observations regarding the balance of occurrences over categories and meta-categories were made. For example, patterns were identified in the types of questions asked in relation to particular meta-categories of proposal development, including questions regarding funders and collaborators which occurred during the Determining meta-category. Repetitions of types of questions were also identified across distinct series of meta-categories, such as the occurrence of design-related questions in the meta-categories of Designing, Planning and Composing/Organizing.

Based on the analysis of the occurrences and nature of the questions and constraints collected for this study, Chapter Four also presented a split of meta-categories into two phases of proposal development – the Creation Phase, made up primarily of developmental activities towards the beginning and middle of situations of proposal development, and the administrative or Logistical Phase in the latter half of the development of a proposal. The division of elements of the proposal process in this

manner was noted as also reflect in the terminology used for the categories and meta-categories of the model (Identifying, Clarifying, Deciding, and Collecting, vs. Working, Administrating, Completing, and Compiling, for instance) and in turn the behaviors they represent.

There are multiple benefits to capturing and orienting the gaps of user understanding onto a model such as the one presented in this study. First, there is value in orienting gaps in relation to their occurrence in the situation, in order to present a dynamic interpretation and representation of that problem/situation in the natural (e.g., user-based) general temporal order, and the language of the user. Second, this representation can then be employed to help determine (and potentially address) issues of users' movement (or lack thereof) from one stage of the model to the next. This is done by identifying the types of questions and constraints, as has been discussed above, in relation to their common occurrences at different points in during the development of a proposal.

The identification of two distinct phases (Creation and Logistical) of proposal development, which stemmed from the analysis of questions and constraints in relation to the model, can also be used to promote targeted service and resource improvements on behalf of offices of research administration at institutions of higher education. Research administrators who facilitate proposal development must work within the bounds of institutional and federal regulations. However, this thesis asserts that institutional value (in terms of well-supported faculty and thus potentially increased submissions) could be gained by directing additional resources to investigating and supporting the cognitive needs of faculty during the Creation Phase of proposal development. By shifting a portion

of the focus of research administrative services and resources to the needs of faculty during the true “developmental” period or front end of proposal development, institutions could provide more holistic support of this integral activity in higher education.

It has also been noted earlier that the proposal development model presented in this study builds upon an earlier model created by Nilan and Fletcher (1987) during a study of National Science Foundation-funded researchers in the late 1980s. The next section discusses similarities and differences between the two user-based models of proposal development process.

### **Comparison to Nilan and Fletcher Model**

In response to a call from the National Science Foundation (NSF) to provide frameworks through which to update the traditional paper proposal submission process to an electronic mail system, Nilan and Fletcher (1987) conducted a study of NSF-funded researchers. Their goal was “to develop a ‘user-oriented’ methodology for information systems design that allows systems to be modeled on user criteria” (p.186). The results of their study were presented as a user-oriented model of the proposal writing process (p.189). Though the samples and terminology are slightly different (faculty, staff, and graduate students vs. faculty; and proposal writing/preparation/activities vs. proposal development), and the studies are 25 years apart, the similarities between the process depictions are evident in a comparison of the models (Table 5.1). Examples of the similarities and differences between the models include:

- Both are composed of language drawn from interviews with users, and represent the temporal order of steps as taken (and articulated) by users, by design;

- Both contain a similar number of major classes of activities / meta-categories (13 and 11), though the Nilan and Fletcher model is more specific at the meta-level, while the proposal development model of faculty cognitive behaviors has greater specification for the of separate categories of activities;<sup>42</sup>
- Both include combinations of cognitive (identifying, thinking, waiting, determining) and physical – preceded and/or accompanied by cognitive – activities (discussing, meeting, writing, notifying);
- The proposal development model of faculty cognitive behaviors introduces a class of activities not present in the Nilan and Fletcher Model – ADDRESSING – which specifically includes activities/interactions surrounding administrative requirements or complications during the proposal process;
- Both contain repetition of common activities during proposal development in some measure – such as writing, reviewing, editing and budgeting; however, the Nilan and Fletcher Model contains repetitions as distinct, fixed-order activities, while the proposal development model of faculty cognitive behaviors allows for repetition of activities (categories) *and* iteration between classes of activities (meta-categories), as indicated by the two-way arrows in Table 5.1.

This last difference represents the greatest benefit of the new model of the cognitive behaviors of faculty during proposal development – its flexibility regarding movement between particular clusters of steps. The arrows in Table 5.1 represent these clusters of

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<sup>42</sup> This is a true similarity in that – though the researcher was aware of the previous model before conducting this study – the Nilan and Fletcher Model was intentionally not consulted during the formation of the proposal development model of faculty cognitive behaviors, including during interviewing process, the physical organization and analysis of steps, and during the creation of the content analytic scheme for type of step, which provided the framework for the new model.



iterative steps. Any step may be skipped or immediately repeated in this model but movement back and forth between steps is allowed, between Finding/Investigating and Planning, between Composing/Organizing and Circulating, and between Wrapping Up, Checking and Finishing. Example diagrams of the order of steps – as collected concerning two highly different situations of proposal development – were provided in Chapter Four to demonstrate the flexibility of this model for various specific situations.

**Table 5.1: Comparison of Models of Cognitive Behaviors during Proposal Development**

Nilan & Fletcher User-Oriented Model of Proposal Activities (1987)		Proposal Development Model of Faculty Cognitive Behaviors (2011)	
MAJOR CLASSES OF ACTIVITIES	USER DESCRIPTIONS OF STEPS	META-CATEGORIES	CATEGORIES (User descriptions of steps)
STARTING/ REVIEWING POSSIBILITIES 1	Reviewing research information	BEGINNING 1	<i>Identifying</i> new topic, needs, partners, data, methods
	Checking notices		
	Waiting for RFP		<i>Inviting</i> collaborators or being invited to apply or collaborate
	Checking funding sources		<i>Receiving</i> relevant information, like a request for proposals
	Workshops		
GETTING RFP 2	We got a request for a proposal	DETERMINING 2	<i>Clarifying</i> proposal information or application process
FORMULATING TOPIC/AREA 3	Discover a need		<i>Deciding</i> to apply/add partners, on a topic/method, or other decisions
	Thought of what to write/identify topic		<i>Meeting</i> about / <i>discussing</i> proposal
	Discussing proposal		<i>Receiving</i> or <i>providing</i> support for or information about proposal
	Looking at details		<i>Reviewing</i> prior proposals
ORGANIZING/ PLANNING/ SPECIFYING OBJECTIVES/ ASSIGNMENTS 4	Preliminary meetings	FINDING/ INVESTIGATING 3	<i>Analyzing/collecting</i> preliminary data, or collecting preliminary feedback
	Preliminary scheduling		<i>Identifying</i> potential partners, funders, research sites; <i>contacting</i> potential partners or funders; or <i>partnering</i>
	Identify research plan/model		<i>Researching</i> information for proposal or <i>reviewing</i> literature and/or funder materials
	Design structure to meet needs	PLANNING 4	<i>Assigning</i> or dividing up of tasks
	Brainstorming		<i>Contacting/notifying</i> relevant personnel
	Checking with others in organization		<i>Determining</i> project approach or partners, or <i>thinking</i> about project or proposal
	Preplanning		<i>Developing</i> of proposal or project components (including redesigning)
	Design instruments		<i>Scheduling</i> proposal development activities
REVIEWING LITERATURE & POSITION PAPERS 5	Identifying background info	COMPOSING/ ORGANIZING 5	<i>Consolidating, reorganizing</i> or <i>revising</i> of proposal or proposal components
	Lit Review		<i>Working</i> – completing some type of work towards developing proposal
	Preliminary studies		<i>Writing</i> or initial organizing of proposal components or ideas

**Table 5.1: Comparison of Models of Cognitive Behaviors during Proposal Development (Continued)**

Nilan & Fletcher User-Oriented Model of Proposal Activities (1987)		Proposal Development Model of Faculty Cognitive Behaviors (2011)	
REVIEWING THE PLAN 6	Review with feedback	CIRCULATING 6	<i>Cycling</i> rounds of proposal versions or components back & forth, including <i>editing</i>
	Storyboard reviews		<i>Meeting</i> , discussing, or talking about proposal
	Meeting with people on the project		<i>Requesting</i> or <i>receiving</i> / gathering of reviews or components of proposal; or requesting new partnerships
BEGIN WRITING /1 <sup>st</sup> DRAFT 7	Write		<i>Reviewing</i> of proposal drafts, components, funder materials or additional literature
BUDGETING 8	Preliminary budget		<i>Adding</i> or <i>inviting</i> new collaborators or partners
REVIEWING AND EDITING 9	Staff feedback	ADDRESSING 7	<i>Administrating</i> proposal development or addressing issues with proposal or project
	Review		<i>Working</i> on proposal, including working on organization of project or working with administrators; or <i>discussing</i> issues with proposal
	Edit	BUDGETING 8	Preliminary or primary <i>budgeting</i> , including re-budgeting of prior related proposals
REWRITING/ FINAL DRAFT 10	Develop more specific objectives of the proposal	WRAPPING UP 9	<i>Collecting</i> necessary paperwork or proposal components, including <i>prodding</i> partners to provide materials
	Fine tuning		<i>Completing</i> proposal development tasks
	Rewrite		<i>Notifying</i> administrative staff or offices of impending submission
BUDGETING 11	Revise	CHECKING 10	<i>Polishing</i> , <i>revising</i> and/or editing of proposal components
	Final costing exercise		Final <i>writing</i> of proposal or remaining components
	Make budget		<i>Anticipating</i> or troubleshooting for problems including <i>identifying</i> outstanding items, and/or <i>questioning</i> or clarifying of proposal items
FIXING LAST MINUTE DETAILS 12	Check budget		<i>Meeting</i> or approaching someone about proposal, or requesting review or approval
	Making copies	FINISHING 11	<i>Reviewing</i> or receiving reviews for full proposal or proposal components
	Scrambling to meet deadline		<i>Revising</i> , editing or <i>updating</i> of proposal or components, including formatting
SUBMITTING 13	Getting final approval from organization/ superiors		<i>Compiling</i> proposal components & paperwork, and printing; or <i>finalizing</i> of proposal draft or components, including budget
	Finish supporting documents		
	Mailing proposal		Submitting, sending or passing off of proposal or components within institution or externally to partners or funder
	Sending the proposal out		
	Publish/distribute proposal		

## Summary

One of the primary contributions of this study is a temporally-based, cognitively-focused representation of proposal development. How is it possible to offer such a model, when the process is highly complex and impacted by a myriad of individual variables? One faculty member's comments on the proposal process in general sums up the essence of this apparent dichotomy:

*They're all different [proposals]. I've written small ones... gotten some, and had some rejected. I've written big ones, had them awarded and rejected. They're all different, but they're all similar – I still have to do the same thing ...*

The point provided highlights one of the assumptions behind this study, for which empirical evidence has now been provided – that though individual proposal development experiences are always different, the overall set of behaviors are similar. It is by layering experiences then examining across them for abstract patterns that these similarities become apparent. The identified patterns are then organized and presented to provide a greater understanding of the problem, which can then help inform the provision of resources and services to users.

One source of power in collecting and reflecting on these similarities back to the user rests in employment of user-based terms. By organizing the model of similar steps during proposal development *in the language of the user*, the model can easily be interpreted by users as a reflection of their own activities. The model also capitalizes on the order of activities as articulated by users, to create a map of potential, recognizable routes, which then can be employed to help a user identify the point in the process where they might be, and provide council on how to navigate through that point.

This model builds upon the user-based model of information behaviors of NSF-funder researchers during proposal development (Nolan & Fletcher, 1987). The contributions of this new proposal development model are not limited to improving the experience of “the user,” however, defined for the purpose of this study as faculty at IHEs. The greater potential application of the model is as a tool for collaborative activities across and external to the educational institutions supporting proposal

development (see Table 3.2 for a list of these stakeholders). Potential implications of this model for supporting collaborative activities between stakeholders of the proposal development process are addressed in the next section.

### **5.3 Support for Collaborative Proposal Development Activities**

As mentioned in the interview protocol development section of Chapter Three, portions of data collected during interviews were not presented as part of the results of this study due to inconsistencies in the collection of data and receipt of responses. For example, faculty intermittently expressed uncertainty or annoyance when asked to identify the resources they employed in response to the questions and constraints they experienced during development of a recent proposal. What emerged during the data analysis and subsequent reviewing of related literature was that, in fact, the faculty had been providing relevant information about their “resources” throughout their interviews – however it was not what was anticipated by the researcher, and therefore was initially dismissed.

One of the differences underlying this difficulty in data collection rested in the researcher’s original (though subconscious) focus on a static classification of resources – as packets of information to be delivered in physical or electronic form, rather than as “elements employed by or potentially employable by users, which allow for movement towards a desired goal or end state” as defined in Chapter One. Resources, in this manner, can include information resources, but also things such as awareness gained by the user through interaction with other individuals, which are used to address uncertainty surrounding problem/situations.

During the interviewing phase of this study, the researcher was anticipating the identification of the various “packets of information” that faculty sought or used to answer their questions. It was only after initial analysis of interview results that the researcher realized that the primary “resource” for faculty during proposal development was interactions with others (which often did not even include a passing- on of information, *per se*, but instead just the act of interacting with others during the situation was often seen as resourceful). Once this realization was made, a more holistic interpretation of interview data was conducted. Evidence of numerous types of interpersonal interactions, as integral to the research process, were scattered throughout the results. These examples highlight an unanticipated result of this study, which was an emphasis placed by faculty on collaborative interpersonal activities during the proposal development process. The next section introduces a call for an additional focus on collaborative activities, as a deliberate tool for supporting proposal development.

## **A Call for Collaborative Activities**

Research administration as a field is primarily structured to address compliance requirements faced by IHEs for sponsored research activities, where the design and delivery of information services and resources are primarily influenced by both federal regulations (Chronister & Killoren, 2006; National Science Foundation, 2010a, 2010b; EDUCAUSE, 2010) and institutional policy. The majority of activities between research administrators and faculty involve research administrators characterized as experts, who provide training to or oversight for faculty seeking to submit proposals. This expert-to-user dynamic of interactions is not inappropriate, necessarily, but it almost exclusively supports a regulatory-driven mode of service. Collaborative activities, in contrast, are

based on a user-centric design, which places the needs of and respect for the user's reality at the center of the design process.<sup>43</sup>

This study calls for further discussion of the value of user-based investigations of information behaviors and subsequent development and/or facilitation of collaborative resources and activities incorporating the findings of such studies. This is not a call for an about-face from one mode of operation to the other (compliance-based vs. user-based), but instead a recognition of the benefits to be gained from integrating an awareness of user perspectives in a complex institutional environment. As noted in Chapter One, the development and submission of proposals has become increasingly burdensome due in part to calls for and expectations of transparency accountability from the public sector (Orszag, 2009; EDUCAUSE, 2010; National Science Foundation, 2010b). However, requirements for transparency regarding the use of federal funds have created both burdens and opportunities for the field of research administration. For example, Monohan & Pascucci (2011) recently identified transparency as a critical component for successful sponsored research administration in primarily undergraduate institutions (PUIs). The authors also note that such transparency is supported through the consideration and validation of faculty perspectives by research administrators, which in turn helps build trust among these stakeholders in high education proposal development. Others have also emphasized the call for the further consideration of faculty perspectives as (Boyer & Cockriel, 1998; Cole, 2007; Wimsatt, Trice & Langley, 2009; Walden & Bryan, 2010) as a way to enhance growth and collaboration in research administration.

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<sup>43</sup> See Whitecar's (2010) recent comments regarding the user-centric (versus techno-centric) focus of collaboration for the field of research administration.

A relatively new niche of research administration has evolved to support collaborative activities surrounding proposal development. These include institutional units focused on training regarding proposal development, special teams brought together to facilitate the development of large, complex high-dollar or interdisciplinary proposals, or high-profile proposals;<sup>44</sup> and the development of a newly formalized organization for research development: the National Organization of Research Development Professionals (NORDP) (Levin, 2011). Founded in 2010, NORDP was developed to provide a national forum to “enhance institutional research competitiveness, and to catalyze new research and institutional collaborations” (NORDP, 2010a). Research development is defined by the organization as:

[A] set of strategic, proactive, catalytic, and capacity-building activities designed to facilitate individual faculty members, teams of researchers, and central research administrations in attracting extramural research funding, creating relationships, and developing and implementing strategies that increase institutional competitiveness (NORDP, 2010b).

This focus on collaborative, developmental activities at the front end of the research process reflects a growing trend in research administration to consider participants in the research process as team members with shared objectives, to be recognized and respected in order to successfully pursue common goals (Cole, 2007).

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<sup>44</sup> As an example – the University of Tennessee has instituted the use of proposal development teams, composed of members selected for the development of certain submissions, including applying faculty members, and administrative personnel across multiple institutional units. Members from these teams have presented team designs and results at recent meetings of the Society for Research Administrators International (SRA) and the National Council of University Research Administrators (NCURA). For example, Robert Porter presented “Proposal Development Teams: A Growing Role in Research Administration” at the 2009 annual conference for the Society of Research Administrators International.

Both the impetus behind and the findings from this study support this burgeoning transformation of research administration from a compliance-driven to a developmentally-focused field. Additionally, this thesis puts forth a call for the ongoing and systematic accounting of information behaviors surrounding research administration as a means developing and supporting collaborative activities in higher education proposal development. Multiple additional studies could be designed to explore this further. For instance, a study on collaboration could be conducted, which incorporates the experiences of multiple parties involved in the development and submission of a proposal. Faculty, departmental and/or school/college level research administrators and central research administration staff could all be interviewed separately to collect different perspectives on one proposal development situation. The interviews could then be cross-analyzed to provide insight as to where and how collaboration during proposal development works well, and where and how it breaks down.

This type of multi-perspective investigation was successfully employed in the Grimshaw and Wilson study (2009). The authors used separate focus groups of academics, researchers, postgraduate students and research administrators and technicians – basically, all users of research development and administration tools, systems and processes – in order to determine information uses and needs relative to the research process. This type of investigation also represents the verification method used in Nilan and Fletcher (1987), who spoke not only to primary investigators funded by NSF, but also to the staff and graduate students involved in the proposal development processes described by the researchers.



## **The Importance of Collaborations & Unified Institutional Support**

The findings from this investigation of faculty information behaviors surrounding proposal development have been used to describe the potential for employing user perspectives to inform multiple stakeholders in the process. In addition to providing the steps and gaps associated with a particular proposal development experience, faculty interviewed for this study were also asked to remark on their perceptions of institutional support for sponsored research – including from the academic unit with which they were most closely affiliated (Department, Center/Institute, or School/College) as well as for the institution as a whole. Comments varied from short observations of the institution (and related academic units) as being supportive or unsupportive, to long discussions of how the various parts of the institution took pains to support research, or how the institution might do better.

Though items were phrased in regards to the general cultural of the institution towards sponsored research, the majority of responses were couched in terms of things that helped or supported sponsored research at the institution, or things that hurt or impeded the pursuit of research funding. Overall, there was a general balance in the report of praise for support provided the university and comments noting perceptions of problems or difficulties.

Multiple positive responses included comments at to how supportive campus leaders are – in terms of how they connect to new faculty, emphasize the importance of securing external funding, and recognize those who succeed in this area. Numerous faculty also noted particular schools and colleges as more supportive in terms of the

assistance and encouragement they provide (in their opinion, as faculty of those schools with greater support), for example:

*[At my school] there is an emphasis and support on sponsored research. We think we get better support than other schools. I know from talking to colleagues that there's practically no support at other schools ...*

Other faculty who made remarks similar to this also noted that they had access to (and took frequent advantage of) their department/center/institute budget managers, or school/college level research administrators. Additional remarks were made regarding the high level of service received from the sponsored research office in the pursuit of external funding. Positive descriptive terms used in regards to the institution including things like “supportive and encouraging,” “healthy system,” and “make it work as a team.”

An equal number of responses were collected that noted negative or mixed perceptions of institutional support for sponsored research activities. These included observations that sponsored research does not play hold significant role in departmental activities; that support is talked about but not provided; that certain school or departmental levels are too over-tasked and don't have enough of their own resources to be supportive, and that, in some cases, grantwriting is discouraged completely when not viewed as valuable to the academic unit in terms of dollars actually retained by the institution. Numerous recommendations were made by faculty on how the institution could better support sponsored research, including:

- Hiring of more faculty with grantwriting experience (to act as mentors);

- Hiring or placement of dedicated grant development administrators in schools and colleges that do not have them currently;
- The provision of support for the statistical/methodological development of grants, and statistical support after receiving a grant;
- Co-locating the sponsored research and contract accounting offices; and
- The provision of additional grantwriting programming.

### *Disparity in Messages Regarding Institutional Support*

One notable similarity between interviews was the number of faculty who remarked on the disparity between the messages provided by the different academic units when compared to each other, and when compared to the institutional mission as promoted by institutional leaders. Examples of such responses are included below:

*[In our Center] the culture is one of good staff support, but the ideas have to come from the researchers – so there's no one answer because different researchers are more or less savvy and put more or less effort into it. Some say they don't (or won't) do it at all ... [But the culture at the institution is] inadequate. I've heard people say (and I don't know if this is true or not) that there are Dean's that think it's a waste of time - which violates what the Chancellor and Provost are trying to do ...*

*Our prior [Center] Director used to encourage it – wanted people to do more. For the most part, people have told me I shouldn't do it, as an Assistant Professor, because it's not counted in tenure. It's less common in other departments [like*

*mine], but I think it's counted in other places. But, people think it's great when you get funded ...*

Some faculty were very outspoken regarding the level of service (or lack thereof) that they perceived from institutional administrative offices, and many noted that the culture seems dependent on the department in question. However, those who were the most vocal about the differences in messages between institutional units were also the faculty who had the most experiences in submitting proposals. The greater the level of experience – and in most cases, success – in proposal development, the greater the perceptions of inconsistencies or inadequacies, and the higher the expectation for institutional support for sponsored research.

Almost all faculty who provided very vocal responses regarding this interview item also provided insightful commentary on how the institution might provide such support. Some noted that they were regularly and publically vocal about their perceptions of institutional support (or lack thereof), however a few mentioned the interview process as cathartic, in that they got to talk to someone who would “listen to them” about these issues. As such, this small portion of the interview identified a need for communication and collaboration which could be easily tapped on a much greater scale through additional studies. This point is addressed later in Chapter Five.

## **Summary**

The bottom-up, user-based approach advocated in this study is viewed as a complementary means of enhancing existing compliance-based proposal development activities at institutions of higher education. Rather than discounting or supplanting

practice-based models of proposal development, the model presented in this study is an effort to instill the practice of research administration with an appreciation for the value of a user-based perspective – to recognize and capitalize on the experiences of faculty as users of research administrative services. Such recognition is promoted through this study in two primary ways: 1) Through the promotion of additional studies of user-needs surrounding proposal development informed by the Sense-Making Methodology, designed to spur “intelligent, respectful conversations between researchers and respondents” as a means to gather information about user behaviors; and 2) As a method to engender the development and facilitation of ongoing collaborative activities in support of proposal development, through which all stakeholders could benefit from meaningful sharing or experience through mutual contribution and participation (Nilan & D’Eredita, 2005).

## **5.4 Recommendations for Additional Research**

Based on the potential applications of this study, as discussed above, as well as the additional interpretations of results presented earlier in Chapter Five, the following recommendations for additional research are made:

- General: Expansion of this study within the original institutional location;
- General: Replication of this study at other institutions of higher education;
- General: Replication of this study within or external to the original location to fields of science outside of the social sciences;

- General: Explore the potential for *collaborative* virtual systems to support proposal development, as informed by user-based studies of collaborative information behaviors;
- Specific: Conduct a study on collaborative activities between faculty and the multiple levels of research administration staff, including experiences of multiple parties involved in the same proposal development situations, to see where these experiences intersect and to engender further collaborations through building shared understanding.

With regards to faculty perceptions of institutional support for sponsored research, one of the immediately relevant applications of findings from this study is the importance of providing a unified message regarding sponsored research at a large academic institution. This study found evidence of contradictory messages expressed by different academic units within the institution, and between those academic units and the institution as a whole. This was captured in responses from faculty to items regarding perceptions of support for sponsored research, as well as from open-ended commentary offered during the interviews. The perceptions of faculty concerning support for sponsored research at their schools and colleges, and the institution in general included remarks on where differences were noticed, and what they (the faculty) might do if given the opportunity to support more research.

Based on the perceptions collected, another specific recommendation for additional research can be made. The institution of this study should conduct an investigation including faculty from all academic units to: determine how faculty view institutional support (or lack thereof) for sponsored research; to diagnose where

disconnects in communication might reside; and to engage faculty in a collaborative, multi-directional effort to support sponsored research across the institution. It is also recommended that this study be conducted via a consultant or neutral third party to ensure anonymity – for those participants that desire it – so that faculty feel free to speak frankly about their perceptions of the support of sponsored research at their institution. While some faculty participants were candid and willing to share their perceptions openly for the purpose of this study, others expressed the desire not to be quoted and/or displayed uncertainty in being able to express their opinions. For this reason it is believed that an independent study would prompt greater participation among the university community, and also help engender frank responses regarding perceptions of institutional support for sponsored research.

## **5.5 Strengths and Weaknesses**

### **Strengths**

The primary strength of this study rests in its value as an example of a user-based exploration of information behavior surrounding the proposal development process. As described in Chapter Two, the call for the exploration of information behaviors as a relevant topic for empirical investigation across a wide variety of disciplines has been issued for decades (most commonly heralded as beginning with Dervin and Nilan's call for a user-based perspective on information needs and uses in 1986). The successful identification of user behaviors across a variety of proposal development situations enabled the organization, presentation and interpretation of a new model of proposal development. This model serves as a dynamic and iterative representation of the process

– one which can be easily translated and applied due to the framing its construction in the natural words and sequence of the users. As such, this study demonstrated the possibility of enhancing practice in a compliance-driven field through a user-based focus.

The strength of the model is further demonstrated through its construction from interviews with a sample designed to represent a broad variance of situational characteristics. Extreme care was taken to provide the greatest variance between experiences in a cluster of disciplines (primarily social science). By identifying similarities across experiences (e.g., different funders, application types, tenure-ranks, disciplines, gender, etc.) the model exemplifies potential for using the cognitive motions of users across time and space to help orient future users in similar situations. Ongoing reviews of interview data were conducted after each interview, in order to determine when data collection would halt – based on redundancy in steps and questions or constraints as collected from respondents.

As discussed earlier in Chapter Five, other strengths emanate from the design and deployment of this study, as well as the analysis of results, which were all enhanced by the experience and current placement of the researcher as a proposal development administrator. This practice-based orientation enabled a detailed understanding by the researcher of the process under study, access to and a rapport with faculty, and a familiarity with the institutional and process-related jargon commonly used by faculty during interviews. Though this last point may seem insignificant, lack of knowledge of the many acronyms associated with proposal development in an institution of higher



education would be crippling during the interview process and subsequent data analysis.<sup>45</sup>

Additionally, the practice-oriented nature of this study leant immediate and actionable benefits to the researcher as a staff member at the institution of the investigation. Developing an understanding of the current research interests and proposal submission experiences of 27 individual faculty members has great value for the everyday practices of the researcher, as a proposal development administrator. The research process itself provided enormous insight for the researcher in terms of the actual rigors of research design and conduct *as a user* as opposed to as a service provider in research administration. Specific interviews conducted also prompted new service opportunities. For example, when one particular interview was completed, a faculty member noted that she had been meaning to make an appointment to discuss funding opportunities for a new project, and wondered if we could talk right then. Thus the occasion of the interview gave way to an impromptu service interaction that might have otherwise been put off. Similarly, another faculty member made the following comments when asked if he had anything else he'd like to relay regarding his proposal development experience, or proposal development in general:

*I know ... we haven't talked about identifying the funding source. [This funder] is always out there, but it's such a long shot. I've gone online and have seen some sources. I've gotten the impression that there [are] other places out there that would fund this, but [that federal department] is so large. I want to apply to [this*

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<sup>45</sup> A brief list of such acronyms could include: 1) Common research funding agencies and foundations in the social sciences, such as NSF, NIH, NICHD, IMLS, DOD, DHS, DOJ, DOE, RSF, RWJ, SRF; and 2) Common form, application or proposal format terms, such as RFP, RFA, BAA, GPG, LOI, MOU, COI, and IRB.

*funder] or to other things I find on Grants.gov, but I think there's more out there.*

*It would be great if there was some organized source for information on this ...*

This comment led to a post interview discussion of potential funding sources between the researcher and the respondent, and the subsequent submittal of a related letter of inquiry to a foundation which the respondent was not aware of before the interview.

Another strength of this study was evidenced by the level of engagement of respondents in the interview process – attributable to both the methods used and the subject matter of the interview. One faculty member noted how interesting it was to see the whole "problem" laid out, and that examining the process in this manner – by breaking it down into steps and questions – was helpful as it made it seem less intimidating for the next time. In fact, three respondents specifically mentioned “breaking it down into steps” as an interesting or valuable part of the experience. Another respondent was very candid about her experience and was eager to tell her impressions about it, grateful that she could "unload" what she "really felt" about the whole experience, while yet another described the process as “almost therapeutic.” All-in-all, 12 out of 27 faculty respondents specifically expressed their appreciation for the interview experience in enthusiastic terms.

## **Weaknesses**

Each of the strengths mentioned, however, also could also be presented in some measure as weaknesses for this study. The experience of the researcher in proposal development potentially introduced negative, albeit unintended biases, such as expectations for certain results. One minor example of this was emanated from an

interview conducted with a senior researcher who had recently wrapped up a large (in dollar amount and number of primary investigators) multidisciplinary proposal. The proposal development process was highly complicated, and the researcher for this study was intricately involved as a research administrator. Because of this, the researcher noted that many of the "steps" iterated reflected a series of related actions – highly condensing a complicated process, and just skimming the surface of the volume of actual activities. It was an exercise in self-restraint for the researcher not to impose additional steps to be included in the sequence offered by the respondent.

This, however, points to a particular benefit the Micro-Moment Time-Line Interview technique, in that the agenda of the researcher is not imposed beyond identifying what the topic (e.g., describing a proposal development experience) and objective (as a series of steps) is for the interview (Dervin, 1983, 1999). In this case, what was most valuable and collected was granularity of steps as provided by the faculty member as the user, and not the impression of the research administrator as the service provider. This is also discussed by Dervin and Nilan as a primary benefit of the time-line based interview method, as providing a content-free structure with which to elicit respondent descriptions of their cognitive movements (Dervin, 1983; Nilan & D'Eredita, 2005). In other words, instead of speaking to the agenda of the interviewer, respondents are free to provide a naturalistic time-ordered description of their experiences *in vivo* (in their own words).

The agenda, or at least the expectations of the researcher, became more problematic, however, during initial data analysis, when results concerning resources employed by faculty did not appear as anticipated. This was determined to be in part

because of the inexperience of the researcher in the interview methods – both in the design of effective protocol items to elicit responses, and in the conduct of the interview. Another factor in the difficulty identifying resources used, however, was the assumption by the researcher of what nature of resources would be identified. This difficulty and the related unanticipated results were discussed earlier in Chapter Five.

Sample size represents a potential weakness for this study. Depending on the methods of data collection, 27 individual interviews may be seen as insufficient. For this study, three separate units of analysis were employed: the situation ( $n=27$ ); steps in situation ( $n=419$ ) and questions/constraint per situation ( $n=173$ ). The goal of this study was to identify similarities across a variety of situations through in-depth interviews with respondents, and therefore traditional parametric statistics and the related standards for sample size do not apply. However, effort was made to ensure redundancy through deliberate sample selection and theoretical saturation through ongoing review interview data for repetition in content (in this case, types of steps and questions/constraints). The purposeful inclusion of a wide variance of individual characteristics (and therefore proposal development experiences) also enhanced the inductive development of a rigorous model of faculty cognitive behaviors. For these reasons, and given the objectives of this study, sample size was not viewed as a true weakness.

## **5.6 Study Summary and Conclusion**

This study was influenced by the area of practice of the researcher – proposal development support in research administration at an institution of higher education. As a provider of information services and resources for the support of sponsored research, and

as a college-level administrator who works closely with faculty to investigate and develop approaches for external funding, the researcher was particularly concerned with learning more about the needs and practices of faculty, in order to provide higher-quality, targeted service to this group of “customers” or users. Thus, an empirical research study of proposal development was viewed as a way to contribute both to the profession, and to the daily practice of the researcher.

At the inception of the study, a review was conducted of the existing literature surrounding proposal development. This review highlighted the focus on expert-based, prescriptive materials. Nilan and Fletcher’s study of NSF-funded researchers (identifying user information seeking and information use behaviors) was drawn from outside of the field of research administration as an example of a user-based empirical study of information behaviors surrounding proposal development. This study served as the impetus for investigating the applicability and potential value of such studies to inform modern proposal development processes. Thus, Nilan and Fletcher provided the framework from which to build the current user-based study of information behaviors of faculty during proposal development.

This study has proven the efficacy of employing user-based methods to investigate information behaviors in a compliance-driven service industry. It has also provided a robust model of the proposal development process, as a validation and extension of the model developed in the 1980s by Nilan and Fletcher. Even so, multiple recommendations for additional study have been made to strengthen the findings of this investigation, including the expansion of this study within the original institutional location, and to other institutions of higher education.

This study was designed to accomplish four main objectives, to:

- Demonstrate the utility of a user-based investigation of information behaviors surrounding proposal development, as a means to support this important activity;
- Investigate the information behaviors of faculty during proposal development activities, through the development and employment of a user-based step model;
- Determine the gaps in understanding (operationalized as questions and constraints) faculty experience in relation to those steps; and to
- Employ the findings from the investigation to make recommendations to research administrators for addressing the problem/situation of proposal development.

These objectives were accomplished by conducting a user-based investigation of the information behaviors of proposal development, as guided by the conceptual frameworks of Taylor's Information Use Environments (IUEs) (1986, 1991) and the Sense-Making Methodology of Brenda Dervin (1983, 1999; Dervin & Foreman-Wernet, 2003).

For the purpose of this investigation, proposal development was characterized as a problem/situation – in the spirit of Nilan and D'Eredita's use of the term as a combination of Taylor's "problem" and Dervin's "situation" – as a time/space context for human cognitive behavior (Nilan & D'Eredita, 2008), and a preliminary product of sense-making, constrained by the past and present experiences of an individual (D'Eredita & Nilan, 2007). Chapter Three detailed the data collection method – primarily in-depth interviews, designed as a modification of Dervin's Micro-Moment Time-Line technique (1983; 2003b/1992, 2003d/1981, 2003e/1984). This study built on Nilan and Fletcher's investigation of NSF funded researchers (1987), providing rich detail regarding the recent proposal development experiences of a purposeful sample of 27 graduate social science

and professional program faculty members from 11 departments of one research-intensive institution of higher education.

A purposeful sampling strategy was employed to ensure coverage of a wide variety of proposal development experiences, in order to tap into a similar variety of related steps and questions or constraints. This variance was further established by ongoing review of interview data during the process to check for redundancy of step and question/constraint types collected.

During interviews, faculty were asked to describe the development of a recent proposal in terms of steps taken or experienced during the process. These steps were then used to probe for questions and/or constraints perceived at specific points in the process. Faculty were also asked to describe their perception of institutional support for sponsored research and any general comments they wished to make regarding this specific experience or proposal development in general.

The interviews were digitally recorded, but the primary contents (steps, questions and constraints) were written on 3 x 5 cards during the course of the interview for the purpose of verifying the order and content of these data points as reported by the respondents. Cards were laid out in a proximal temporal order during the course of the interview, with steps arranged in horizontal order, and questions and constraints placed in vertical order beneath the primary step during which they occurred. This timeline of proposal development was repeatedly referred to during the remainder of the interview to anchor the respondent in the situation, thereby enhancing both recall of the experience and comprehension by the interviewer of faculty responses. This style of interviewing, then, is beneficial for the strong positive effect it has on both participants and researchers

– the respondent quickly becomes convinced that the interviewer is listening to him/her and accurately representing events in her/his experience, and the interview benefits from this establishment of respect and active listening by having an engaged, enthusiastic respondent.

Data were organized and analyzed through standard content analytic procedures, including the development of a robust data matrix, which guided coding of the interview text. A thorough scheme for type of step was painstakingly developed. This was accomplished through repeated rounds of physically organizing step cards in chronological order, each situation placed vertically above or below the next in order to identify patterns of steps across situations.

The content analytic scheme for type of step (and thus the resultant model of proposal development) was then tested for intercoder reliability. A reliability coefficient (PAI) of 87% was achieved. This measure of reliability was deemed suitable for support of the model of proposal development, especially in light of the granularity of the model (i.e., 38 categories and 11 meta-categories, for a total of 48 unique categories employed to code 419 instances of steps across problem/situations of proposal development). In addition to the creation of a model, this study collected and reviewed faculty commentary on perceptions of institutional support for sponsored research.

This thesis has presented the potential benefits of conducting user-based studies of information behaviors incorporating methods adopted from the Sense-Making Methodology. After describing the investigation and results from a study of proposal development experiences in a higher educational setting conducted in this manner a call was made for further investigation and development of *collaborative activities* to support



proposal development, specifically and deliberately including input from multiple users or stakeholders in the process. A model of faculty cognitive behaviors during proposal development was presented in response to this call. The model from this study is not meant to be a prescriptive representation of a “problem” common to institutions of higher education – it is not a recipe for proposal development. Instead, the model can be seen as flexible artifact to support collaboration – as means to help stakeholders understand and talk to each about a common goal.

In this manner the model was offered as a potential tool for co-orienting faculty and research administrators in the proposal development process, and as the basis for the design, development and/or facilitation of related collaborative services and resources. The implication for systems design is the potential for the creation of a dynamic user-based model, which is continually updated to include new or refined steps (and thus reflects new and changing experiences), which in turn empowers users to share links to newly created or discovered resources, thus supporting collaborative proposal development. Thus, both the model of faculty cognitive behaviors during proposal development, and the method of investigation, are presented in order to inform the field of research administration, and to instigate discussion and further study of information behaviors surrounding proposal development.

## APPENDICES

### Appendix A. E-mail Request for Interview

<DATE>

Dear Professor <LAST NAME>,

Hello. My name is Christina Leigh Deitz, and I am a doctoral candidate in information management at the School of Information Studies here at Syracuse University. I am also a practicing research administrator. I am conducting a study regarding the proposal development process at institutions of higher education. As a faculty member with a record of recent proposal submissions I was hoping you might be willing to participate in an interview regarding your most recent proposal development experience? [ADD IF APPLICABLE: You have been referred to me as a potential participant by <REFERRING FACULTY NAME> as a colleague at Syracuse University and recent participant in this study.

The interview should take approximately 1.5 hours, and I am able to meet with you at a time and place of your greatest convenience. I intend to use the results of this and other interviews to help improve grant development services at this institution, and to expose the study of information behaviors as a potential tool for informing grant development processes at other institutions of higher education.

Your responses will be kept completely confidential; all potentially identifying features will be removed before public dissemination of the results. Please note that this research project was not designed or developed in conjunction with my employer (Syracuse University). I am acting solely in my capacity as a doctoral student of the School of Information Studies in the conduct of this interview. An IRB exemption has been obtained, IRB# 10-320, November 17, 2010.

If you would be willing to participate in the interview, please contact me via e-mail, phone or in person. I would also be happy to answer any questions you might have regarding my research before scheduling an interview.

Thank you for your time,

Christina Leigh Deitz

*Candidate*

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## Appendix B. Interview Protocol and Consent

### SECTION 0.1 INTERVIEW INFORMATION

Respondent # \_\_\_\_\_ Location (Generic – type) \_\_\_\_\_

Date \_\_\_\_\_ Gender \_\_\_\_\_ Time: Begin \_\_\_\_\_  
End \_\_\_\_\_

### INFORMED CONSENT

“Hello, and thank you for agreeing to this interview. As I explained in my e-mail, I am conducting research on proposal development here at Syracuse University, as a candidate of the professional doctoral program in information management at the School of Information Studies. I also work here at SU as a research administrator for the Maxwell School.”

“For the purpose of this interview, there are no right or wrong answers to the questions I will be asking, and your answers will be kept **strictly confidential**. This interview is **not** intended to be an evaluation of your work behavior. Your participation in this interview is completely voluntary, so you should feel free to refuse to answer any item or withdraw from this interview at any time. You are, of course, also free to ask questions at any time.”

“May we proceed?” \_\_\_\_\_ No “Thank you for your time.”

\_\_\_\_\_ Yes

“I will be recording some notes here on the interview script, and some notes on these 3 x 5 cards, which I will review with you to make sure I understand your responses correctly. The whole process will probably take around one to one and a half hours. In order for me to pay more attention to your responses, do I have your permission to record our conversation? Please remember that your name will not be attached to your responses in any way.”

\_\_\_\_\_ No

\_\_\_\_\_ Yes. “Thank you.” <<Proceed>>

### CONFIRM PROPOSAL DEVELOPMENT EXPERIENCE TO BE DISCUSSED

*<<List proposal found from OSP Highlights prior to interview on post-it note attached to this page.  
If more than one potential proposal, list all.>>*

“According to the Office of Sponsored Programs Highlights pages posted to their website, you recently submitted the following proposal(s):” <<Read off proposal(s)>>

“Is this information correct? May we talk about this proposal, or is there one I haven’t mentioned that you’d like to discuss?”

<<OR>>

“Which one of these proposals would you like to talk about, or is there one I haven’t mentioned that you’d like to discuss?”

## **SECTION 1: ACTION DIMENSION**

**1.0** “Proposal development is a complex activity, with many steps and actors, especially when conducted at a research university such as Syracuse. Even accomplished faculty with a record of proposal submissions and grants received may feel uncertain at different points during proposal development. As someone who has recently (within the last year) submitted [a/one or more] proposal[s], I’d like you to recall your most recent experience with developing a proposal. If you could please think about this for a few moments, then provide for me a brief summary of your experience with that particular proposal and the circumstances surrounding it (in terms of what the proposal was for, who it was being submitted to, who was involved...)? I will be taking some notes while you are speaking.”

*<<Respondent provides description. **Record the description of the situation on this sheet.** Repeat what you are writing down with the interviewee. **No probing.**>>*

### **STEPS IN SITUATION**

**1.1** “Let’s look at this in some more detail. Please recall for me the main steps that occurred during the development of your proposal. A step can be something you decided, an action you took, something someone else did, or something that just happened. As you tell me about each step, I’m going to make notes on these cards – one for each step.”

*<<Write each step on separate card. Lay steps out vertically on surface in chronological order, facing respondent>>*

“Ok, so what was the next step that occurred?”

“And the next?”

*<<If one or more of steps described are too granular:>>* “OK, that’s good, but what we are trying to do is get a general description of your process through the development of your proposal – we want to find a middle ground between too much detail (which will take too long) and too little detail, which won’t give us enough information. Think of a comic strip, where the writer has to convey the key moments to tell the story. So, with that in mind, what would you say the primary steps were?”

### **REVIEW OF ACTION DIMENSION**

**1.2** “So looking at these steps, would you say they accurately depict the development of your proposal, or do you want to add any steps or make any changes?”

*<<Make additions or changes to cards and ask for verification of contents.  
When respondent happy with representation of situation, move on to SECTION 2.>>*

“Wonderful. So now we are going to look at these steps to get some more detail about your experience.”

## **SECTION 2: COGNITION DIMENSION**

**2.0** “Ok, now that we have a representation of the proposal creation, can you identify for me the first point that was really tricky or difficult out of these steps?”

*<<Allow respondent time to think back and/or ask clarifying questions.>>*

*<<If respondent asks for more information or clarification:>> “For example, maybe you weren’t sure what to do next, or you weren’t certain where to find answers or who to talk too. The point where things didn’t go well, where you had a difficult question or a preponderance of questions, or where you felt constrained in some way – something that caused you to pause, or just when the development of the proposal stopped.”*

*<<Record indication of critical step on step card!>>*

*<<When respondent points out a step>> “Ok, so for this step right here that represents a difficult point, I want you to take another moment and think back about what **questions or constraints** you faced in relation to this step. The questions don’t have to be something that you asked out loud –they could just be questions in your head in relation to this particular step during the development of your proposal, or constraints meaning something that was holding you back or preventing you from moving forward in the proposal development process ...”*

*<<Allow respondent time to think>>*

**2.1** “Now that you have those questions and constraints in mind, I’d like you to tell me about what gave you the biggest pause during this step – something that you needed to find an answer to before you moved forward in the development of your proposal. I am going to write the questions or constraints on new cards.”

**2.1.1** “What was the next most pressing question or constraint for you at this step? And the next?”

*<<Write each question identified by the respondent on a separate colored card in the order given by the respondent. **There is no probing at this phase. You may need to reign in the participant, keep them focused on just more-or-less stating questions.** Review the contents of each card with the respondent, and place vertically under the appropriate step card to which it applies (so now you are adding vertical factor to the horizontal chain of events).>>*

**2.1.2** “Are there any other questions or constraints besides these that you had during this step of the development of your proposal?”

*<<Point to step card. Add any additional questions and/or rearrange the order of the questions as instructed.>>*

“Wonderful. So we now have a good representation of the questions and constraints you experienced during this step of your proposal development. Now, I’d like to repeat this process for the steps before and after this *<<pointing to most difficult point>>*. Take a moment and think back about what questions and constraints you had in relation to this step *<<pointing to prior step>>*. Remember, questions can be something that you asked out loud to another person (or sent in an e-mail), or they could just be questions in your head in relation to this particular step during the development of your proposal, or constraints meaning something that was holding you back or preventing you from moving forward in the proposal development process ...” *<<Allow respondent time to think>>*

“OK, so what question or constraint gave you the biggest pause during this step *<<Point to prior step card>>?*”

*<< Repeat 2.1.1 and 2.1.2 for prior step>> <<Repeat 2.1, 2.1.1 and 2.1.2 for post step>>*

*<<If time allows **move on to the next most difficult step** in the proposal development process (**record indication of 2<sup>nd</sup> most critical step on card**). Complete Steps 2.1-2.1.2 for the 2<sup>nd</sup> most difficult step and its prior and post steps>>*

<<*If running long for interview time:*>> “We are running a bit longer than I had noted we would. May we continue, or would you like to wrap up now?”

**2.2** “Now I know we’re not catching all of your questions during this experience, but looking at your whole experience and those questions we’ve laid out here, did you experience any other crucial questions or constraints during the development of your proposal?”

<<*Write responses for each question / constraint on NEW (4<sup>th</sup>) COLOR card.*>>

**2.4** “Lastly, what were the things that helped or facilitated the development of this proposal?”

### **SECTION 3: ACROSS TIME/SPACE: SIT. WRAP-UP, ORGANIZATIONAL STRUCTURE & DEMOGRAPHY**

“Finally, I’d like to conclude with a few general questions about the situation you described and also get some general information about you and your work environment. I need these types of answers in order fully understand your situation, as well as to describe who responded to the questions and to compare answers for analysis. Please remember that your answers will be kept strictly confidential and all of the data will be aggregated across individual respondents.”

#### **SITUATIONAL WRAP-UP**

**3.1.1** “Now let’s look for a minute at the proposal development process as a whole. How long did the situation last?”

< **1 mo**    **1-2 months**    **3-5 months**    **6-9 months**    **10-12 months**    **13-18 Months**    >  
**18 months**

**3.1.2** “How many faculty/senior researchers were involved?”

**3.1.3** “What number and type of support staff did you work with?”

**3.1.4** “How does this proposal experience compare with others you have had (if applicable)? For example, how was this more or less /difficult complicated, and/or what were the unique features of this proposal experience?”

**3.1.5** “If we think about your experience in terms of difficulty, how would you rate it on a 0-10 scale, with 0 representing the easiest proposal you’ve developed and 10 representing the most difficult proposal you’ve developed (if applicable)?”

0 \_\_\_\_\_ 5 \_\_\_\_\_ 10  
Not difficult                      Moderately difficult                      Very  
difficult

**3.1.6** “What was it about this proposal that made you give it a <<*state rating given*>>?”

## **WORK ENVIRONMENT**

**3.2.1** “Where in your institution is your strongest affiliation (by unit) in regards to sponsored research/submission of proposals?”

**Individual  
University**

**Departmental  
Other**

**Center/Institute**

**School/College**

**3.2.2** Name of affiliated unit: \_\_\_\_\_

**3.2.3** Considering all the members of your <<*department/Center/Institute*>>, what percentage would you say are proposal active?”

**3.2.4** “Please describe the culture in your <<*department/Center/Institute/School*>> in regards to proposal development and sponsored research. For example, some departments don’t emphasize sponsored research, while at the other end of the spectrum, some rely research awards for survival. How would you characterize your <<*department/Center/Institute*>>?”

**3.2.5** “Ok, so we’ve been talking about your <<*department/Center/Institute*>>. Now let’s talk about the University as a whole. Please describe the culture of the University in regards to proposal development and sponsored research. For example, how does the institutional structure, its procedures or its resources positively or negatively affect the development of proposals?”

**3.2.6** “Are you influenced by any forces outside of this institution in regards to proposal development?”

**3.2.7** “Is there anything else that you would like to relay regarding this particular proposal development experience, or proposal development in general, that we have not already covered?”

## **DEMOGRAPHICS**

“I need to gather some basic demographic information on my interview subjects to describe my sample.

Remember, all of your responses are kept confidential.”

**4.1** “How would you describe your ethnicity?\_\_\_\_\_

**4.2** “Which category best describes your age?” ◦ 20-30 ◦ 31-40 ◦ 41-50 ◦ 51-60 ◦ 61-70 ◦ 71 or Over

**4.3** “How many years have you been in your current or a comparable position?” \_\_\_\_\_

**4.4** “How many years of experience do you have in submitting proposals?” \_\_\_\_\_

“Thank you very much for your time.”



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